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## DISEASES CAUSED BY BACTERIA AND FUNGI

Davidson, I. (1961). **Observations on the pathogenic staphylococci in a dairy herd during a period of six years.**—Res. vet. Sci. 2, 22-40. [Author's summary.] 981

Milk samples, teats, and for the last 3 years udder surface, 5 different areas of skin and all external orifices were examined for staphylococci. These were identified by bacteriophage typing. The ecology of each mastitis-producing strain is described and the importance of the various sites as sources of infection for the udder assessed.

It was found that the most important source was the udder itself, and that pathogenic staphylococci commonly multiply on the udder surface as well as inside the udder. Quantitative analysis suggests that most infections of other sites were secondary to infection of the udder.

Schmahlsteig, R. (1960). Ein Beitrag zum Mastitisproblem, die Abhängigkeit der Euter-gesundheit von äusseren, insbesondere inneren Merkmalen der Zitze. [The problem of mastitis in relation to certain teat characteristics.]—Mh. Tierheilk. 12, 157-166 & 171-181. 982

S. classified the shape of the teats and the shape of the teat canal, its orifice and its sphincter from 100 udders affected with mastitis. There was no single feature that was commonly associated with mastitis. Thickness and disposition of teat sphincter muscle played no part in incidence of mastitis, neither did the various combinations of types of teat orifice and teat canal, or shape of the rosette at the internal orifice of the teat canal. But mastitis quarters often had an S-shaped teat canal or a canal out of line with the axis of the teat cistern.—R.M.

Smith, I. M., Wilson, A. P., Hazard, E. C., Hummer, W. K. & Dewey, M. E. (1960).

**Death from staphylococci in mice.**—J. infect. Dis. 107, 369-378. [Authors' summary modified.] 983

The fate of cocci in body organs was followed by means of quantitative bacteriological techniques. Death was dependent on the increase of the total bacterial population in the body above a critical threshold no matter how and where this took place. Apparently innocuous routes of infection became lethal when the dose of inoculum was sufficiently high. Using large doses of *Staph. aureus* the authors could not reduce the time from injection until death below 60 minutes.

Hinton, N. A., Maltman, J. R. & Orr, J. H. (1960). **The effect of desiccation on the ability of *Staphylococcus pyogenes* to produce disease in mice.**—Amer. J. Hyg. 72, 343-350. 984

Organisms which survived exposure designed to mimic natural air drying had decreased virulence for mice by the intramuscular, intravenous or intracerebral routes.

These findings were discussed in relation to the epidemiology of staphylococcal disease.—R.M.

McCune, R., Dineen, P. & Batten, J. C. (1960). **The influence of antimicrobial agents on total populations of staphylococci in animal tissues.**—J. Immunol. 85, 447-464. [Authors' summary modified.] 985

The course of experimental infection with two strains of *Staphylococcus aureus* during antimicrobial therapy was studied in the mouse by the microbial enumeration technique. An apparent drug antagonism was observed when penicillin was administered with other anti-staphylococcal drugs in the treatment of infections induced with the penicillin-resistant Giorgio strain. When treatment was delayed until renal lesions were established, there was



a decrease in the effectiveness of streptomycin and novobiocin in reducing the renal staphylococcal populations, whereas this delay did not curb the effectiveness of penicillin, oxytetracycline or erythromycin. With all five drugs employed and with both strains of *Staph. aureus*, microbial persistence was observed throughout the 28-day period. In no instance was the infection rendered truly latent among all the animals in a particular experimental group. There were indications that the distinctive pattern which staphylococci displayed with regard to drug-susceptibility *in vivo* obtained only during the first 2 weeks of the observation period. From this point on, with the exception of the observations made in the kidneys of the delayed streptomycin- and novobiocin-treated animals, in a 4-week experimental period all of the microbial populations tended to fall in a similar fashion.

Lambert, H. P. (1960). **Gamma globulin in experimental staphylococcal infections.** — J. Lab. clin. Med. 56, 701-710. [Author's summary modified.] 986

In the treatment of staphylococcal infections in man the main difficulty is that of overcoming, or preventing the development of, sizeable local foci of infection. Possible protective factors were studied in g.pigs: systemic administration of gamma globulin was ineffective in modifying the development of local staphylococcal lesions in the skin and did not prolong the period during which an antibiotic could affect the course of these lesions.

Gamma globulin contains a small quantity of staphylococcal antitoxin. It is suggested that the reported protective effects of  $\gamma$ -globulin in acute lethal infections in mice may be attributable to its content of antitoxin; some evidence for this view is given.

Gamma globulin is ineffective in the prevention or treatment of focal staphylococcal lesions.

Fesce, A., Negretti, F. & De Zulian, V. (1960). Interazioni "in vivo" tra stafilococchi e streptococchi. Nota II—Effetti patogeni della associazione stafilococco-tossine streptococciche e streptococchi-tossina stafilococcica. [Interactions between staphylococci and streptococci in animals. II. Pathogenicity of combined bacteria and toxins.]—Arch. Vet. Ital. 11, 177-188. [Summaries in English, French and German.] 987

Pathogenic synergy was observed in albino mice injected i/p with a combination of *Staph. aureus* and culture filtrates of *Strepto-*

*coccus agalactiae*, *dysgalactiae* and *uberis*. This is ascribed to activation of the pathogenicity of *Staph. aureus* by substances elaborated (even *in vitro*) by the streptococci. Experimental data also suggest that these substances vary, in intensity and possibly also in composition, during infection, and consequently during multiplication in animals or during growth on a given medium.—T.E.G.R.

Cernea, I., Drăghici, C. & Bangău, S. (1960). Cercetări bacteriologice privind vaginita granuloasă a bovinelor. [Bacteriological studies on granular vaginitis in cows.]—Lucr. Inst. Pat. Igienă anim., București 10, 137-149. [In Roumanian. Summaries in French and Russian.] 988

Extending their previous work [V.B. 30, 2054] the authors isolated Group D streptococci from the vagina of 172 of 174 cows with granular vaginitis: 80 of the strains were typed and were compared with 31 strains isolated from 134 faeces samples. *Str. faecalis* made up 69% of vaginal and 68% of faecal strains, *Str. faecium* made up 24% of vaginal and 12% of faecal, *Str. bovis* 1.25% of vaginal and 20% of faecal, *Str. durans* 6.25% of vaginal and none of the faecal strains.

Various strains were used in attempts to set up granular vaginitis, which succeeded in 13 out of 29 cows. The authors believed that faecal streptococci were a causal factor in granular vaginitis.—R.M.

Agababyan, M. M. (1959). [Production of radioactive anthrax bacilli.] — Izv. Akad. Nauk Armyan. SSR, Ser. Biol. 12, No. 1. pp. 69-74. [In Russian.] 989

Radioactive anthrax bacilli were grown in glycerine-peptone agar containing radioactive sulphur in the form of methionine. The optimum concentration of radioactive sulphur was 5.5 microcuries per ml. Addition of vitamins B<sub>6</sub> and B<sub>12</sub> increased the growth of the bacilli and their absorption of radioactive sulphur by 80%.—M.G.G.

Mihajlović, B. & Stojković, M. (1960). [Haemolysin of *Bacillus anthracis*. IV. Effect of normal sera on haemolysin and its antigenicity.] — Acta vet., Belgrade 10, No. 1 pp. 31-36. [In Serbian. Summary in English.] 990

Normal horse, ox, sheep, pig, dog and rabbit serum neutralized *B. anthracis* haemolysin in high dilutions. The neutralizing property of horse serum was highest (1:10,000 and higher), of dog serum lowest and that of calf serum lower than that of



adult cattle. Immunization of rabbits and sheep neither increased nor decreased the neutralizing effect of their serum and it was concluded that haemolysin was not identical with *B. anthracis* antigen or its fractions.

—E.G.

Larsen, A. B., Vardaman, T. H. & Harvey, W. R. (1960). **Tuberculin reaction size as related to the number of simultaneous tuberculin injections.**—Amer. J. vet. Res. 21, 1075-1077. [Authors' summary modified.] 991

Eighteen cattle, sensitized with bovine tubercle bacilli in mineral oil, were tested with intradermal tuberculin. The number of i/d injections given to an individual animal in a given test varied from 1 to 60. Thirty days after each test, the animals were rotated so that each was given a different number of injections on the subsequent test. For example, an animal given four injections in one test might be given 60 in the next.

It was found that as the number of simultaneous tuberculin injections increased, the average size of the reaction that each would elicit decreased.

Prokúpek, K. (1960). Kultivace a typizace mykobaktéria tuberkulózy z jatečného materiálu se specifickými změnami. [Cultivation and typing of tubercle bacilli from abattoir material with specific lesions.]—Čsl. Epidem. Mikrobiol. Immunol. 9, 78-87. [In Czech. Summaries in English and Russian.] 992

P. isolated 401 strains (389 from cattle and 12 from pigs) of tubercle bacilli from 911 specimens of TB. lesions. Of these, 397 were bovine type, two avian type and the remainder human type *M. tuberculosis*, three of which were dysgenic strains. Of the bovine type strains eleven yielded luxuriant cultures with a rough, cauliflower-like surface. Only about 5.5% grew by direct culture on solid egg medium. Details were given of preliminary enrichment on a liquid medium.—E.G.

Illěš, J. (1960). Príspevok na objasnenie súvislosti medzi tuberkulózou ľuďí a hovädzieho dobytku v malorolníckych chovoch. [Relationship between tuberculosis in man and cattle on small farms.]—Vet. Čas. 9, 491-507. [In Slovak.] 993

Of about 10,000 cattle tested in a district of Slovakia during 1950-1959, 11.8% yielded positive tuberculin reactions, whereas lesions were present in only about 0.5% (69 from 12,783) of adult cattle slaughtered during the

same period. Since contact of reactors with tuberculous persons was proved in 262 of 401 small farms, and on another 32 farms such contact was likely, it was concluded that the comparatively high percentage of reactors was the result of allergy to human-type tubercle bacilli. About 90% of a number of reactors removed from the infected environment lost their tuberculin allergy within 5-6 months.

—E.G.

Anon. (1960). **Tuberculosis in animals.**—Nature, Lond. 187, 996-998. 994

TB. in animals was reviewed at the 4th Symposium of the Zoological Society of London. Dealing with comparative pathology, it was stated that incidence in calves is low, infection being either congenital or by inhalation; haematogenous dissemination is frequent. In older animals the incidence is much greater and is therefore not a progression of lesions acquired in calfhood; the infection is predominantly pulmonary and advanced pulmonary TB. develops as a result of bronchial dissemination following cavitation of the primary lung focus. In TB. of the udder there is always extensive involvement of the milk ducts. In the pig, the chief route of infection is by the alimentary tract and this gives rise to an incomplete primary complex in the regional lymph nodes. Chronic pulmonary TB. occurs infrequently. Horses are highly resistant; primary infection is almost entirely by ingestion. Haematogenous dissemination is frequent and produces either miliary TB. or large, tumour-like masses, not unlike those of sarcoma.

TB. is no longer a cause of serious loss of poultry, because of the lower age of birds kept, and improved husbandry, but it still accounts for a fairly high proportion of condemnations of poultry carcasses. The disease affects domestic and wild birds and the latter may infect farm animals; the avian-type bacillus may cause progressive disease in pigs and accounts for one-third of reports of TB. in pigs in Gt. Britain.

Incidence of TB. in dogs and cats is much reduced. Bovine type infection is rare among cats but a few cases of human type infection occur. Infection in dogs is mainly of human type and was found in 1-2% of autopsies in Gt. Britain in the last 5 years.

Of zoo animals, the primates are very susceptible and the disease is common in all vertebrates; all 3 main types of the organism are involved and carnivores are often infected



with the human type, apparently by the public. Treatment is possible but control is best effected by destruction of the diseased animal, disinfection, and by testing incoming animals before they leave their country of origin.

The eradication of TB. from cattle in Gt. Britain began with the Tuberculosis Attested Herds Schemes in 1935. The current overall incidence is now only 0.16% of tested animals, though in some areas it is as low as 0.05%. Bovine type TB. in pigs has been markedly reduced and may disappear.

—E.V.L.

Anon. (1960). **Tuberculosis in domestic animals other than cattle.** — Brit. vet. J. 116, 373-379. 995

A review, prepared by the Animal Health Division of the Ministry of Agriculture, of the current status of TB. in horse, sheep, goat, pig, dog and cat in Great Britain.

—A. ACKROYD.

Halík, J. (1960). Diagnostika tuberkulózy u hydiny rychlou kvapkovou aglutinacíou krvi a séra. [A blood or serum slide agglutination test for the diagnosis of tuberculosis in poultry.]—Vet. Čas. 9, 550-559. [In Slovak. Summaries in English, German and Russian.] 996

The slide agglutination test was used for the examination of 372 fowls for TB. The antigen was prepared from 19 field strains of avian type bacilli and from the laboratory "Borstel" strain. After growth on Petragnani's medium with glycerin, for 25-30 days at 40°C., 0.2% formalin or 0.5% carbolic acid in saline, was added to the cultures. After a further 24-48 hours at room temp., cultures were repeatedly washed with saline and centrifuged and the sediment finally resuspended in saline containing formalin and 0.4% sodium citrate, giving an approximate concentration of 5-6 milliards of bacilli per ml. The suspension was then kept for several minutes at 80°C. and allowed to cool, after which the pH was adjusted to 7.0. The slide agglutination test was stated to be quicker, more sensitive and specific than the ordinary tuberculin test. As for antigenicity, strain "Borstel" was superior to the field strains.

—E.G.

Rankin, J. D. (1961). **The non-specificity of a complement-fixation test used in the diagnosis of Johne's disease in cattle.**—Res. vet.

Sci. 2, 89-95. [Author's summary modified.] 997

Over 5 years some 20,000 c.f. tests for Johne's disease were carried out on some 800 cows in 3 herds. Two herds were free from infection with *Mycobacterium johnei*; the third was not. In the infected herd more than 40% of the cattle gave one or more positive tests. But in the clean herds about 30% of the cattle reacted in the same way. Fourteen reactor cows, 3 of which had been positive on 10 or more occasions, were slaughtered from the clean herds and no evidence of Johne's infection was found P.M. Thirteen reactor cows from the infected herd also were without evidence of disease P.M. It is suggested that this test is questionable as the basis of an eradication scheme.

Tamarin, R. (1960). [The cultivation on slides of *Myco. johnei* (paratuberculosis) from sheep.] — Refuah vet. 17, 117-122. In Hebrew. [In English p. 178. English summary modified.] 998

T. described a method of growing *Mycobacterium johnei* from sheep on slide-culture, similar to that used for tubercle bacilli. Positive results were obtained within a fortnight with strains that required 2 months for growth on solid media. In one sample of faeces from an affected cow, growth was apparent after 4 days' incubation. Further work is necessary to establish whether this method is a practical means of diagnosing the disease in sheep.

Smith, H. Williams. (1960). **The examination of milk for the presence of *Mycobacterium johnei*.** — J. Path. Bact. 80, 440-442. [Author's summary.] 999

*Mycobacterium johnei* was isolated from the milk of 1 of 20 cows suffering from clinical Johne's disease. It was not found in any of 52 herd samples of milk collected at different times from 10 farms on which Johne's disease was a serious problem.

Schaaf, J. & Beerwerth, W. (1960). Die Bedeutung der Generalisation der Paratuberkulose, der Ausscheidung des Erregers mit der Milch und der kongenitalen Übertragung für die Bekämpfung der Seuche. [Control of Johne's disease: significance of generalization of the disease, congenital transmission, and excretion of the bacterium in milk.] — Rindertuberk. u. Brucellose 9, 115-124. 1000

Generalized infection was demonstrated by culture from organs and lymph nodes in



177 of 202 diseased animals. Of 36 foetuses of 2-9 months, 23 were infected, but this infection was found to be only partially dependent on the state of the disease in the cow. The organism was excreted in milk from 5 of 73 infected but clinically healthy cows.

—E.V.L.

Doyle, T. M. (1960). **Vaccination against Johne's disease.**—Brit. vet. J. 116, 294-301. 1001

Since 1946, a vaccine consisting of 5 mg. of a moist-dried culture of living avirulent *Mycobacterium johnei* suspended in equal parts of liquid paraffin and olive oil plus some powdered pumice has been used subcutaneously in calves under 30 days old in a number of tuberculosis-free but Johne's disease infected herds in Gt. Britain. This vaccine produces an inflammatory nodule about the size of a walnut and is believed to protect against Johne's disease as long as acid-fast bacilli are present in the nodule, probably 15-30 months. Revaccination is necessary every 18 months but may result in abscess formation. Only some of the animals have been vaccinated 2-4 times. When the trial had been in progress 7 years, 60 owners reported a total of 52 losses amongst vaccinated cattle, 32 having no losses, compared with 927 losses in 59 herds in the 5 years prior to the trial and 612 losses in unvaccinated animals in 30 of the herds in 3½ years after vaccination began. The vaccine sensitized animals to both avian and mammalian tuberculin, but analysis of 4,139 reactions in vaccinated cattle showed that 85% had a greater reaction to avian tuberculin. No evidence has been found that vaccination creates carriers and clinical symptoms of Johne's disease have not been seen in any vaccinated animal with acid-fast bacilli still present in the nodule. A modified vaccine has now been evolved consisting of a larger weight of the same strains of *M. johnei* but suspended in equal parts of castor and camphorated oils. It produces no nodule nor abscess formation on revaccination and in 3 herds, has eradicated clinical disease.—A. ACKROYD.

Munday, B. L. (1960). **The effect of parturition upon tuberculin reaction in cows vaccinated against Johne's disease.**—N.Z. vet. J. 8, 99-100. [Author's summary.] 1002

A decrease in sensitivity to avian tuberculin was noted in the immediate post-parturient period in two out of three cows

which had been vaccinated against Johne's disease.

Harris, A. H. (1961). **An outbreak of ulcerative enteritis amongst bobwhite quail (*Colinus virginianus*).**—Vet. Rec. 73, 11-12 & 13. 1003

Heavy mortality in artificially-reared bobwhite quail imported (as eggs) from the U.S.A. was attributed to ulcerative enteritis. The disease has not been recorded before in Britain, but it occurs in North America. There was no evidence of coccidia or helminths. Coliform bacteria were present in intestinal lesions. The disease appeared to be controlled by 0.04% furazolidone in the food. Another outbreak on the same farm involved crested quail (*Lothortyx californica*).—R.M.

Thonn, S., Lebon, E., Saphon & Triau, R. (1960). Note sur une épizootie de mélioidose porcine au Cambodge. [**Outbreak of melioidosis in pigs in Cambodia.**]—Rev. Elev. 13, 175-179. [Summaries in English and Spanish.] 1004

The first 3 outbreaks of *Pfeifferella whitmori* infection in pigs to be reported in Cambodia were characterized by abortion, slight paresis of the hind quarters, mild fever and death. Pedigree animals were much more susceptible than indigenous pigs.—M.G.G.

Shuman, R. D. (1960). **Experimental evaluation of culture and serum vaccination for the control of swine erysipelas. VIII. Further observations on serum potency with relation to immunization of weanling pigs.**—J. Amer. vet. med. Ass. 137, 606-610. [Author's summary.] 1005

Three different concentrations of ARS standard lot 10 anti-swine erysipelas serum, when tested in mice, had decreasing potency as indicated by the ascending median effective doses (ED-50). The 3 lots of serum were used in the simultaneous culture and serum vaccination of weanling pigs farrowed by susceptible dams. On a group basis, the experimental results did not indicate an approach to the minimal level of serum potency. On an individual basis, however, the minimal level was believed to be demonstrated in several pigs.

Zuffa, A., Novák, Z. & Rajtar, V. (1960). Porovnanie imunizačnej účinnosti živých avirulentných vakcín proti červienke ošipáných s účinnosťou inaktivovanej červienkovej adsorbátovej vakcíny. [**Comparative evaluation of live avirulent and killed adsorbed swine erysipelas vaccines.**]—Vet. Čas. 9, 447-



461. [In Slovak. Summaries in English, French, German and Russian.] 1006

The immunizing property of three avirulent strains of swine erysipelas bacilli—EVA, AV/R9 and WR2—was tested in mice and pigs. All three strains produced satisfactory immunity in mice, but WR2 killed between 10–20%. Simultaneous application of serum and culture did not produce immunity. A soluble antigen, associated with immunity, was not demonstrable in any of the strains.

Pigs were immunized either by s/c doses of 2, 3 or 5 ml., or by application of 0.2 ml. of 18-hour culture to scarified areas of the skin. Strain WR2 was the only one to produce a mild local reaction in a small proportion of pigs, but only after scarification; its protective power was superior to the other strains and compared well with a commercial formolized, adsorbed vaccine.—E.G.

Dorobanțu, R. (1960). Studiu asupra puterii aglutinante a serului normal de cal față de bacilul rujetului. [**Agglutination of swine erysipelas bacilli by normal horse serum.**]—Probl. Epiz., București No. 10. pp. 31–40. [In Roumanian. Summaries in French and Russian.] 1007

Suspensions in saline of 10 strains of live *E. rhusiopathiae* were agglutinated by 34 of 36 serum samples from healthy horses at varying titres. The highest agglutination titre of normal horse serum was 1:3,200, whereas titres of serum from hyperimmunized horses were generally higher than 1:26,600. The agglutinating capacity of normal serum diminished at 56°C. and disappeared completely between 58°–60°C.—E.G.

Borman, G., Olson, C. & Segre, D. (1960).

**The trigeminal and facial nerves as pathways for infection of sheep with *Listeria monocytogenes*.**—Amer. J. vet. Res. 21, 993–1000. [Authors' summary modified.] 1008

Four of 17 sheep given *E. monocytogenes* directly in the infraorbital or superior buccal nerves (branches of the trigeminal and facial nerves, respectively) developed listeriosis with localization of the infection in the central nervous system. Five other sheep had either lesions of the c.n.s. or clinical signs or both (2 sheep), suggesting infection.

These positive results support the belief that infection occurs either by a haematogenous route or along the pathway of the trigeminal or facial nerves. The negative results (13 of 17 sheep) indicate that listeria organisms do not always move from a

peripheral branch of the trigeminal or facial nerves to the brain.

Movsesyan, T. B. (1959). [**Pathology of the lymphatic system in acute natural and experimental pasteurellosis in cattle.**]—Izv. Akad. Nauk Armyan. SSR, Ser. Biol. 12, No. 1. pp. 55–61. [In Russian.] 1009

A detailed account of the histological findings.—M.G.G.

Jean-Blain, M., Joubert, L., Ruckebusch, Y. & Oudar, J. (1960). Vitamine A et infection pasteurellique expérimentale du porc. Sur l'étiologie de la "toux de porcherie". [**Vitamin A and experimental pasteurella infection in pigs, with reference to the aetiology of coughing in pigs.**]—Bull. Acad. vét. Fr. 33, 275–285. 1010

Of 12 pigs divided in lots of 3 each, 9 were fed a diet deficient in vitamin A and the rest (controls), a normal diet. All were kept in unhygienic sties, and were subjected to airborne *Past. septica* infection and to stress (a 120 km. journey in a truck, under bad conditions). They were slaughtered after 130 days. P.M. findings are described; *Past. septica* was isolated from the lung lesions of 4. It is concluded that vitamin A deficiency predisposes to *Past. septica* infection. Control measures recommended are: administration of vitamin A to the sows before and during pregnancy and during lactation and to the young pigs from the age of 2 weeks; attention to hygiene.—T.E.G.R.

Cheah Phee Phay. (1960). **Haemorrhagic septicaemia and fowl cholera vaccine. Production in the Veterinary Research Institute, Federation of Malaya, Ipoh.**—J. Malay. vet. med. Ass. 2, 163–176. 1011

In Malaya, the use of a 24-hour haemorrhagic septicaemia (HS) broth bacterin (killed vaccine) prepared locally by Montgomerie's technique from pasteurella strains from buffaloes, cattle and pigs resulted in cases of anaphylactic shock and death but the substitution of a 72-hour broth bacterin largely eliminated this. Trials of alum precipitated HS and fowl cholera vaccines indicate that they are superior to broth bacterin. Chick embryo fowl cholera vaccine was found unsatisfactory.—A. ACKROYD.

Orlandella, V. (1960). Ricerche sull'azione che esplica la *Pasteurella multocida* inoculata, da sola o associata a ialuronidasi, nel sottocute di cavie normali o trattate con A.C.T.H., cortisone o desossicorticosterone acetato.



[Effect of subcutaneous inoculation of *Pasteurella multocida*, alone or with hyaluronidase, on normal guinea-pigs and on guinea-pigs treated with corticosteroids.] — Acta med. vet., Napoli 6, 259-280. [Summaries in English and French.] 1012

Hyaluronidase did not exert a spreading effect. Pre-treatment with corticotrophin, cortisone or deoxycortone acetate did not alter the defence mechanism of g.pigs injected s/c with *Past. multocida*; all the g.pigs developed an abscess at the site of inoculation.

—T.E.G.R.

Knox, K. W. & Bain, R. V. S. (1960). The antigens of *Pasteurella multocida* type I. I. Capsular polysaccharides. — Immunology 3, 352-362. [Authors' summary modified.] 1013

Dried cells of *Pasteurella multocida* Type I were extracted with 2.5% sodium chloride solution. Acidification of the extract with HCl to pH 3.8 yielded a fraction containing protein with some polysaccharide and lipopolysaccharide. This was removed by centrifugation. Addition of ethanol to the supernatant precipitated a polysaccharide (containing fructose, mannose, glucose and glucosamine) which could be further fractionated into products containing varying proportions of glucosamine and fructose. It is produced by both 'blue' non-capsulated and 'fluorescent' capsulated phases of the same strains. From the former it is almost entirely released into the surrounding medium instead of remaining bound to the surface layers of the bacteria. The purified (heterogenous) polysaccharide fraction is precipitable and fixes complement with homologous sera. When added in repeated amounts to rabbit and cattle sera against whole bacteria until no further precipitate formed it reduced but did not abolish the mouse protective power of the sera. It did not immunize mice to challenge when injected subcutaneously or intraperitoneally in doses ranging from 2 to 100 µg.

Millican, R. C. & Rust, J. D. (1960). Efficacy of rabbit pseudomonas antiserum in experimental *Pseudomonas aeruginosa* infection. — J. infect. Dis. 107, 389-394. [Authors' summary modified.] 1014

Antiserum prepared by immunizing rabbits against pseudomonas is highly effective, when given prophylactically or therapeutically, in protecting mice against otherwise fatal infections. Crude antiserum preparations

were 250 to 800 times more effective than ordinary human gamma globulin in protecting mice against fatal infections.

Henson, J. B. & Grumbles, L. C. (1960). Infectious bovine keratoconjunctivitis. II. Susceptibility of laboratory animals to *Moraxella* (*Hemophilus*) *bovis*. — Cornell Vet. 50, 445-458. [Authors' summary modified.] 1015

Cultures of *Haemophilus bovis* on agar, chick embryo and fluid medium were inoculated by various routes into chick embryos, day-old chicks, newly weaned rats, rabbits, g.pigs, and mice. Lesions were produced in chick embryos, rabbits, and mice. Chick embryos were killed by all cultures. A high concentration of smooth-type organisms was isolated from the embryo fluids. Mice were killed by intravenous, intraperitoneal, and intracerebral inoculations, and dermonecrosis and ophthalmitis were demonstrated in rabbits.

Kudělka, E. & Holec, J. (1960). Příspěvek k etiologii, diagnostice a léčbě koli-mastitid u krav. [Aetiology, diagnosis and treatment of coli mastitis in cows.] — Veterinářství 10, 409-414. [In Czech.] 1016

Circumstances favouring the appearance and spread of *E. coli* mastitis were investigated in 63 quarters of 36 cows, from each of which *E. coli* had been isolated. The authors discussed the influence of unsatisfactory hygienic conditions such as poor drainage, damp bedding and cold and draughty byres, and the effect of machine milking, puerperal infections and digestive disorders, on incidence. Incidence was highest in August (42%) and September (35%). Infection was confined to a single quarter in 19 cows to two in 12, and to three in one. All four quarters were affected in 4 cows. Infection of the rear quarters was twice as frequent as of the fore. —E.G.

(1960). Symposium on enteric diseases of calves.

I. Inglis, J. S. S. The relationship of husbandry to calf scours: a review.

II. Smith, H. Williams. The ecology of the intestinal bacteria of the calf with particular regard to *Escherichia coli*.

III. Ingram, P. L. & Lovell, R. Infection by *Escherichia coli* and salmonella.

IV. Dalton, R. G., Fisher, E. W. & McIntyre, W. I. M. Antibiotics and calf



diarrhoea. — Vet. Rec. 72, 1174-1194. Discussion: pp. 1194-1199. 1017

I. Inglis paid special attention to infection, nutrition of the dam, nutrition of the calf and environmental temperature, and he compared his observations in south-western Scotland with results reported in the literature.

II. Although proliferation of *E. coli* occurred in the upper regions of the intestinal tract of scouring calves, bacterial counts of the faeces did not reveal any difference between healthy and scouring calves: the *E. coli* were usually outnumbered by other bacteria. Phage typing revealed the complex ecology of coli bacilli in the intestine of calves. The widespread use of antibiotics was reflected in the increased incidence of resistant strains in the general calf population.

III. Ingram & Lovell discussed the present position of *E. coli* and *Salmonella* with regard to classification, natural distribution, infection of calves, and therapy. They concluded that it was more important to improve the calf's environment than to treat infections in individual cases.

IV. The effect of streptomycin, neomycin, chloramphenicol and the tetracyclines on the incidence and severity of diarrhoea in 280 calves was studied. Some (particularly chlortetracycline and oxytetracycline) greatly reduced the incidence of diarrhoea under certain conditions, when given by mouth in full therapeutic dosage twice daily over 14 days.—R.M.

Buxton, A. & Thomlinson, J. R. (1961). The detection of tissue-sensitizing antibodies to *Escherichia coli* in oedema disease, haemorrhagic gastro-enteritis and in normal pigs.—Res. vet. Sci. 2, 73-88. [Authors' summary modified.] 1018

Using a passive cutaneous anaphylactic test in guinea-pigs and an antiglobulin haemagglutination test, the authors demonstrated antibodies to *E. coli* serotypes O138 : K81(B), O141 : K85(B) and O8 : ? in sera from normal pigs and from cases of oedema disease and haemorrhagic gastro-enteritis. Changes in diet and environment of pigs could result in the sudden and rapid multiplication of haemolytic *E. coli* in the intestines. It was postulated that most pigs became hypersensitive to *E. coli*; that the absorption of relatively large quantities of bacterial polysaccharide from the intestines, resulting from the sudden multiplication of *E. coli*, leads to a state of anaphylactic shock; and that

this is reflected in the development of the characteristic symptoms and lesions of oedema disease and haemorrhagic gastro-enteritis.

Bugeac, T., Berbinschi, C. & Dumitrescu, A. (1960). *E. coli* beta hemolytic și boala edemelor la porci. [**Beta haemolytic *Escherichia coli* and porcine oedema disease.**] — Probl. Epiz. București No. 10 pp. 9-20. [In Roumanian. Summaries in French and Russian.] 1019

Beta-haemolytic *Escherichia coli* was isolated, sometimes in pure culture, from 72.2% of pigs which had died from oedema disease. These strains were pathogenic for mice. Pigs injected i/v with frozen and thawed culture developed typical oedema disease, whereas those injected i/v with culture filtrate did not.—E.G.

Heptinstall, R. H., Michaels, L. & Brumfitt, W. (1960). **Experimental pyelonephritis: the role of arterial narrowing in the production of the kidney of chronic pyelonephritis.**—J. Path. Bact. 80, 249-258. [Authors' summary.] 1020

A combined study of the radiographs of the arterial tree of the kidney and the histological picture in rabbits infected intravenously with *Escherichia coli* with 3 days' occlusion of the ureter showed no evidence of arterial obstruction, though the macroscopic and microscopic changes closely resembled those of human pyelonephritis. It was considered that the major factor in the production of scarring was damage inflicted during the acute inflammatory phase, and that ischaemia caused by organic arterial narrowing plays an insignificant part.

Kauffmann, F., Braun, O. H., Lüderitz, O., Stierlin, H. & Westphal, O. (1960). Zur Immunchemie der O-Antigene von Enterobacteriaceae. IV. Analyse der Zuckerbausteine von *Escherichia*-O-Antigenen. [**Immunochemistry of the Enterobacteriaceae. IV. Sugar components of the O antigens of *E. coli*.**]—Zbl. Bakt. I. (Orig.) 180, 180-188. [Summaries in English, French, Spanish and Russian. English summary modified.] 1021

The O antigens of 29 serologically classified *Escherichia coli* strains were isolated in the form of the purified lipopolysaccharides, the sugar constituents of which were determined. The analysed O antigens belong to 14 different chemotypes.

The following sugars were found: galactosamine, glucosamine, heptose(s),



galactose, glucose, mannose, fucose, rhamnose, and colitose (3-deoxy-L-fucose). Besides the most simple chemotypes with 4 sugars only *E. coli* O antigens may be composed of 5 or 6 sugars; one chemotype (XII) was found to have a combination of 7 sugars.

The O antigens of enteritis strains often contain fucose or colitose. In *E. coli* species of other pathological or non-pathological origin fucose was found only rarely, colitose was absent.

Mlinac, F. (1960). Utjecaj uzgoja nekih *Salmonella* i *E. coli* u biljnim supstratima na njihova značajnija svojstva te vrijednost ovih supstrata za dugotrajni uzgoj ovih vrsta bakterija. [Effect of cultivation on vegetable substrates on some characteristics of certain *Salmonella* organisms and *E. coli*.] — Vet. Arhiv 30, 77-85. [In Croat. Summaries in English and German.] 1022

Cultures of *Salmonella schottmülleri*, *S. typhi-murium*, *S. cholerae-suis* var. *kunzendorf*, *S. anatis* and *Escherichia coli* grown in media prepared from wheat, vetch and soya bean extracts, were compared with cultures of these organisms grown in peptone broth. Between 184 and 307 passages per strain were made over a period of two years. Growth was generally abundant. Considerable morphological changes were, however, observed in certain *salmonella* and *E. coli* grown in media containing vegetable extracts. There were gonidia of 3-4 segments, comet-like formations, S-shaped filaments, chains of 5-7 rods or up to 10 cocci, and large spherical forms. Motility in motile forms was unaffected. After a number of passages in these media, *salmonella* strains failed to ferment glycerine. The structure of flagellar antigens in passages changed repeatedly. The value of vegetable extract media for isolation and continuous culture as a substitute for meat extract media was discussed.—E.G.

Mortelmans, J., Claeys, R. & Guinée, P. A. M. (1960). A new *Salmonella* type (*S. ngozi*) isolated separately in its monophasic and biphasic form from a dog and a gecko. — Antonie v. Leeuwenhoek J. Microbiol. 26, 255-256. 1023

During a rabies-control survey in the Ngozi province of Ruanda-Urundi this new *Salmonella* was isolated from faeces of a healthy native dog. Its formula is 48 : z<sub>10</sub> ; 1:5. —R.M.

Corsico, G. (1960). Sull'isolamento di salmonelle da visceri di conigli regolarmente macellati e ammessi a libero consumo sotto vigilanza sanitaria veterinaria. [*Salmonella* in the organs of rabbits.]—Clin. vet., Milano 83, 257-263. 1024

The liver and gall bladder of 250 slaughtered rabbits were examined and *Salmonella typhi-murium* was isolated from 8 livers, which did not show lesions. Inspection of slaughter rabbits for the prevention of salmonellosis in man is discussed.—T.E.G.R.

Sieburth, J. M. (1960). Stable, standardized, sensitized chicken erythrocytes for the polyvalent *Salmonella* indirect hemagglutination test.—Amer. J. vet. Res. 21, 1084-1089. [Author's summary modified.] 1025

In a study designed to improve the reliability and storage quality of chicken erythrocytes sensitized with *salmonella* antigens for the polyvalent indirect haemagglutination test, techniques were developed to detect abnormal blood cells, select optimum antigen strains, and stabilize the sensitized erythrocyte preparations. Red blood cells from certain birds which did not yield an end-point or gave false high titres, could be detected by their prolonged sedimentation rate after washing but before sensitization. There was some correlation between this phenomenon and the lesions of the avian leucosis complex. Suitable antigen strains were selected on the basis of those giving low non-specific titres while still giving high specific titres. The addition of formalin to 10% suspensions of sensitized erythrocytes yielded cells which were stable for at least seven days at 20°C. and 180 days at 5°C. The preparation of standardized, sensitized erythrocytes that are stable up to one year should increase the accuracy and application of the indirect haemagglutination test.

Henderson, W., Morehouse, G. L. & Cross, R. F. (1960). The effect of furazolidone on *Salmonella pullorum* and agglutination titers in chickens.—Avian Diseases 4, 223-230. 1026

Furazolidone was given as 0.011% of the ration to 79 chickens for 5-12 weeks after oral infection with *S. pullorum*. In the third week after infection and weekly thereafter, 8 birds were killed and examined for *S. pullorum*. Only 2 birds developed agglutination titres during the period of feeding furazolidone, 4 and 6 weeks after infection, and one of these yielded *S. pullorum*. Two birds yielded *S. pullorum* after receiving furazolidone for 3



and 12 weeks, without having developed agglutination titres. Three weeks after withdrawal of the drug, 2 developed agglutination titres and both yielded *S. pullorum*. Six weeks after withdrawal, another became positive and *S. pullorum* was recovered.—M.G.G.

Anon. (1960). Food poisoning in England and Wales, 1959. A report of the Public Health Laboratory Service. — Mon. Bull. Minist. Hlth Lab. Serv. 19, 224-237. 1027

This report refers to infection of human beings with *S. typhi-murium* from milk and *S. pullorum* (and other salmonella) in eggs. There was an increase in salmonella infections during 1959; serotypes are listed. A table shows the 63 serotypes isolated on 227 occasions from animal foods and from fertilizers during the year.—R.M.

Anon. (1960). The area program for brucellosis control. — Canad. J. publ. Hlth 51, 368-369. 1028

This communication comes from the Health of Animals Division of the Canada Department of Agriculture. At the end of March 1960, 107 areas were certified and testing was under way in 134 areas. Areas in which not more than 1% of the total cattle population or 5% of the herd population are infected are certified for three years. Over three million cattle (27% of Canada's cattle population) are either in Brucellosis Certified areas or in areas where testing has commenced. The level of infection was below that anticipated: about 8.5% of herds or 1.3% of animals were infected. No date has yet been fixed for the completion of eradication.—R.M.

Buri, H. H. & Wupper, O. (1960). Über die Anwendung von "Pecudin" bei der Sanierung eines brucelloseverseuchten Rinderbestandes. [The place of "Pecudin" therapy in the eradication of bovine brucellosis.]—Rindertuberk. u. Brucellose 9, 161-172. 1029

After abortions due to brucellosis had occurred among 19 stabled cattle, all the animals were given 10 g. daily of "Pecudin" [see *V.B.* 29, 1327] in the food for a year. Details are given of abortions, blood and milk tests, and the excretion of brucella during this period. At intervals, all the reactors were culled and replaced by uninfected animals. Three cows already infected when treatment began gave birth to live calves (2 with the excretion of brucella in the placenta), and only 4 of 16 cattle in contact with infected animals developed positive reactions. Three of these

4 excreted brucella in the milk and placenta. But no definite conclusions could be drawn on the possible effect of "Pecudin". Trials in experimentally infected cattle were recommended, with the use of controls.—M.G.G.

Kharina, N. P. (1960). [Increasing the sensitivity of the tube agglutination test for brucellosis.]—J. Microbiol., Moscow No. 9 pp. 109-113. [In Russian. Summary in English.] 1030

In tests on human sera, sensitivity was increased by using live Strain 19-BA as antigen.—R.M.

Bulanov, P. A., Nauryzbaev, E. N. & Myakushina, A. A. (1959). [Attenuation of *Brucella abortus* and production of a vaccine strain by passage in snakes.]—Trudy Alma-Atinsk. zoovet. Inst. 11, 321-325. [In Russian.] 1031

Four snakes (*Ancistrodon halys* and *Vipera renardi*) were each inoculated s/c with 1,000 million organisms of virulent *Br. abortus* and they were caged for a month at 24°C. Then they were killed: sera contained agglutinins at titres of 1:3,200 and above. Brucella cultures obtained from organs were passaged in five successive batches of snakes which were killed 2 or 3 months after inoculation. After six passages, two strains, labelled A-5 and A-6, were obtained. Tested on g.pigs and rabbits, the strains produced agglutinins but were not pathogenic. Single inoculation produced slight immunity but double inoculation at an interval of 22 days protected g.pigs from s/c inj. of 10 million organisms of *Br. melitensis* five months later. Strain A-6 appeared to be more immunogenic than A-5. —R.M.

Urbaschek, B. (1960). Immunologische Studien an Brucellen. I. Chemische Fraktionierung von *Brucella abortus* Bang. [Immunological studies on brucella. I. Chemical fractionation of *Br. abortus*.]—Z. Immunforsch. 120, 279-287. 1032

Strain Scherle II, isolated from a bovine foetus in 1956, was split into two lipopolysaccharide fractions and one lipid fraction. This paper describes only the method of preparing the fractions.—R.M.

Oltzki, A. L., Markenson, J. & Margalith, M. (1960). Studies on the active immunization of mice against experimental brucella infections by DNA-conjugated proteins and passive protection tests by anti-DNA-immune sera.—Proc. 5th int. Meet. biol. Standardiza-



tion, Jerusalem, 1959. pp. 375-382. [In English. Authors' summary modified.] 1033

Deoxyribonucleic acid (DNA) proteins prepared according to the method of Braun, Burrous & Phillips (1957) possessed low toxicity and exerted excellent immunizing effect in mice: 0.01 µg. of DNA-protein was still effective as immunizing antigen and DNA-protein immune sera protected mice from *abortus* and *melitensis* infections.

Because the active immunizing potency of DNA-protein was not lowered by treatment with DNA-ase, it seems that the DNA moieties were not responsible for their immunizing effects.

The association of surface antigen with DNA-protein is a highly active antigen complex which leads to a solid immunity of mice injected with 0.01-1.0 microgramme.

Payne, J. M. (1961). A comparison of the value of the intrauterine route of vaccination with that of the intramuscular route in the prevention of experimental infection of the rat's placenta with *Brucella abortus*.—Res. vet. Sci. 2, 62-66. [Author's summary modified.] 1034

Intra-uterine vaccination with *Br. abortus* Strain 19 in rats induced immunity similar to that resulting from intramuscular vaccination. As the vaccine was injected into one uterine horn only, and the opposite horn was equally protected, it is likely that the immunity is general and not local.

Neither intramuscular nor intra-uterine vaccination protected the placentas against an infective dose of *Br. abortus* injected directly into the pregnant uterus.

Payne, J. M. (1960). The bacteriology of experimental infection of the rat's placenta. —J. Path. Bact. 80, 205-213. [Author's summary modified.] 1035

Various bacteria injected i/p into pregnant rats showed wide variation in their ability to infect the placenta. For some strains of *Br. abortus* and *V. fetus* as few as 1,000 organisms sufficed, whilst others required much larger numbers. Ability to infect the placenta varied with the route of injection and with the stage of pregnancy. If injected in the first half of pregnancy *V. fetus* rarely infected the placenta and *Br. abortus* was much reduced in infectivity. This phenomenon may be associated with the late development of the chorioallantoic placenta which is functional only during the second half of pregnancy.

Prior vaccination with *Br. abortus* Strain 19 protected the placenta and foetus against challenge with Strain 544. Injection of pregnant rats may therefore be a practical method for testing the efficiency of vaccines or other prophylactic agents.

Leistner, W. (1960). Die Bedeutung der Brucellose bei der Fleischhygiene. [Brucellosis and meat hygiene.]—Mh. VetMed. 15, 682-685. 1036

*Brucella* was isolated 9 times from the lymph nodes, 7 times from the organs, 4 times from the udder and udder lymph nodes, and 3 times from the muscle of 54 slaughtered cattle positive serologically for brucellosis. Recommendations were made on the treatment of meat and skins from such animals.

—M.G.G.

Sadler, W. W. (1960). Present evidence on the role of meat in the epidemiology of human brucellosis.—Amer. J. publ. Hlth 50, 504-514. 1037

It was estimated that in the U.S.A. about 1.25% of beef and 1.15-3.5% of pork carcasses were infected with brucella. Since in the U.S.A. about 24 million adult cattle and nearly 76 million pigs are slaughtered annually, public health risks are considerable. S. stated that it is impossible to assess the actual number of cases in man because of the inevitable proportion of unrecognized infections and the variety of people exposed, which includes not only abattoir, cold storage and meat industry personnel, but also retail butchers, chefs, housewives and even consumers of under-cooked meat.—E.G.

Zinneman, H. H., Briggs, D. R., Hall, W. H. & Glenchur, H. (1960). The molecular sizes of blocking and agglutinating antibodies in human brucellosis.—J. Lab. clin. Med. 56, 960. [Authors' abstr. modified.] 1038

Immunologically "pure" blocking and agglutinating antibodies were isolated from the sera of several infected human beings by means of starch block electrophoresis. The agglutinating fractions were pooled to give a protein concentration of 1.3 g. per 100 ml. Blocking fractions of the same protein concentration were similarly prepared. The pooled agglutinating fractions gave a titre of 1:640; the blocking titre of the pooled beta globulin fractions was 1:160. The adsorption of antibodies by heat-killed *Brucella abortus* was estimated by comparison of ultracentrifugal patterns before and after adsorp-



tion. About 10% of the protein was adsorbed from the gamma globulin peak (containing agglutinating antibodies) with an assumed sedimentation constant of 6.5. The pooled blocking fractions appeared as two peaks, one of 5.6S, the other of 4.6S. Adsorption with *Br. abortus* amounted to about 18%, a larger portion being adsorbed from the lighter 4.6S peak.

These experiments seem to confirm the postulate that blocking antibodies consist of protein molecules which are considerably smaller than those of the agglutinating antibodies.

Hay, J. (1960). Brucelozja zający w Polsce. [Brucellosis in hares in Poland.] — Med. Wet., Warszawa 16, 577-581. [In Polish. Summaries in English and Russian.] 1039

Of 911 hares 207 gave a positive reaction to a modified ring test for which 2 ml. of negative cow's milk and 2 drops of haemolysed hares' heart blood were used. *Brucella suis* var. Thomsen was isolated from 2 hares which had lesions suggestive of brucellosis (enlargement of spleen, liver, testicles and lymph nodes with yellowish-green, caseating foci).

—M. GITTER.

Olitzki, A. L. (1960). The antigenic relationship between phenol extracted bacterial deoxyribonucleic acid and other soluble antigens of brucellae studied with the aid of the agar gel precipitation technique. — Brit. J. exp. Path. 41, 623-632. [Author's summary.] 1040

DNA-conjugated proteins isolated from *Br. abortus*, *Br. melitensis* and *Br. suis* were highly antigenic and when injected into rabbits produced precipitating immune sera. These immune sera reacted with the antigens in agar diffusion experiments producing one sharp precipitation line up to a dilution of 1:64. They gave a positive flocculation test in tubes up to a dilution of 1:128. No DNA-conjugated protein specific for a single species of the *Brucella* genus was demonstrated among these antigens.

The production of bacterial agglutinins by DNA-proteins is ascribed to the presence of small amounts of agglutinogens in the preparation. These agglutinins were removed by intact bacteria, leaving the precipitins reacting with DNA-conjugated proteins intact.

Morgan, W. J. Brinley, Kay, D. & Bradley, D. E. (1960). *Brucella bacteriophage*. — Nature, Lond. 188, 74-75. 1041

Bacteriophage from Poland was propa-

gated and suspended in 0.033 M phosphate buffer containing 0.003 M magnesium, 0.00025 M calcium and 1/10,000 albumin. Assay on *Br. abortus* 544 gave a value of  $2.8 \times 10^{10}$  plaque-forming particles/ml.

The phage preparation lysed all cultures of *Br. abortus* but none of 4 cultures of *Br. suis*; 24 of 33 cultures of *Br. melitensis* were also lysed. In a further experiment, the phage preparation was titrated using *Br. abortus* 544 and *Br. melitensis* Strain H as host cultures; the value against *abortus* was  $2.8 \times 10^{10}$  plaque-forming particles/ml. and  $9 \times 10^9$  against *melitensis*.

By electron microscopy the phage particles were found to be polyhedral, 65 mμ across, hexagonal in plan view and bore a wedge-shaped tail, 14 mμ long. They were indistinguishable from *coli* phage T3 and may be the first example of this morphological type outside the *coli*-typhoid group of phages.

—E.V.L.

Wolff, J. W., Heirman, A. L. & Bohlander, H. J. (1960). A survey of the occurrence of leptospirosis in a dairy herd in the Republic of Panama. — Trop. geogr. Med. 12, 82-90. [Summary in Spanish.] 1042

Sera from 22 normal cows, 37 cows that had aborted, and 11 bulls were tested for agglutinins against 15 types of leptospire: the results are shown in a table. Because these results indicated that the herd had been exposed to various pathogenic leptospire, 212 sera were collected from cattle, horses, pigs, dogs, deer, and persons milking the cows; strips of filter paper dipped in the sera were sent to Amsterdam for examination. Positive results with one or more antigen were obtained from 13 of 55 human sera, 42 of 106 bovine, 5 of 18 equine, 2 of 19 porcine, none of 7 canine. The predominant serotypes in cattle belonged to the hebdomadis group.—R.M.

Justice, W. H. (1960). Observations of serological titers of cattle vaccinated for leptospirosis. — Vet. Med. 55, No. 10, pp. 67-70. 1043

There was no significant rise in serum antibody titre in calves aged 4½-5½ months, following vaccination with *L. pomona* killed cultures.—E.V.L.

Varfolomeyeva, A. A., Perova, K. S. & Miniovich, F. L. (1960). Effectiveness of leptospiral gamma globulin in experiments. — J. Hyg. Epidem. Microbiol. Immunol. Prague



4, 424-431. [In English. Summaries in French and German.] 1044

Bullocks were immunized with *L. grippotyphosa*, *pomona* and *icterohaemorrhagiae*. Gamma globulin prepared from their serum was tested on 164 rabbits. Small doses proved to be very effective for prevention and treatment of *L. grippotyphosa* and *pomona* infections.—R.M.

Clark, L. G., Kresse, J. I., Marshak, R. R. & Hollister, C. J. (1960). **Leptospira pomona infection in a woodchuck. Preliminary report.**—Publ. Hlth Rep., Wash. 75, 925. [Authors' introduction modified.] 1045

In an epidemiological study of leptospirosis and brucellosis in cattle and wildlife in Pennsylvania, *L. pomona* was isolated from a south-eastern woodchuck, *Marmota monax monax*. This was the first time *L. pomona* had been isolated from this species in the U.S.A. Infection with *L. pomona* is common among cattle in south-eastern Pennsylvania.

Galton, M. M., Gorman, G. W. & Shotts, E. B., Jr. (1960). **A new leptospiral subserotype in the hebdomadis group.**—Publ. Hlth Rep., Wash. 75, 917-921. [Authors' summary modified.] 1046

The strain is represented by 20 isolates from raccoons, opossums, and a striped skunk in Georgia, U.S.A. Cross agglutinin-absorption studies indicate that the new strain is a subserotype of *L. mini*, and the designation *L. mini georgia* is proposed.

Babudieri, B. (1960). **Vaccine against leptospirosis.**—Proc. 5th int. Meet. biol. Standardization, Jerusalem, 1959. pp. 313-350. [In English. Author's abst. modified.] 1047

After an historical review on the preparation and testing, in different countries, of leptospiral vaccines, the preparation, standardization, control, field testing and evaluation of vaccines against human and animal leptospirosis are described.

Coghlan, J. D. & Norval, J. (1960). **Canicola fever in man from contact with infected pigs. Further observations.**—Brit. med. J., December 10th, 1711-1713. [Authors' summary modified.] 1048

Of 16 further cases of canicola fever in the Edinburgh area [see *V.B.* 27, 3211], 11 had had contact with 5 pig-farms. A high percentage of the pigs at all these farms were shown by serological tests to be probably actively infected. *Leptospira canicola* was isolated from the urine and kidneys of pigs

at one of these farms; the infection appeared to have been maintained in the herd for many years. At two farms incriminated five years previously in human outbreaks 87% of sera of pigs had antibody levels high enough to signify that active infection was still present.

Similar investigations on a herd basis in pig farms in other parts of the country are recommended.

Bader, F. (1960). **Über drei Fälle von Tetanus beim Hund. [Tetanus in three dogs.]**—Schweiz. Arch. Tierheilk. 102, 551-559. [Summaries in English, French and Italian.] 1049

One dog bitten in a hind leg died in 7 days and a second with an infected fracture of the tibia died 3 days after amputation of the limb; serum and penicillin therapy was ineffective. A third dog with an apparently milder infection through a toe abscess recovered in 14 days with penicillin alone. Chlorpromazine hydrochloride ("Largactil") relieved symptoms.

—E.V.L.

Zemjanis, R. & Hoyt, H. H. (1960). **The effect of growth factors on the growth of Vibrio fetus.**—Amer. J. vet. Res. 21, 1109-1113. [Authors' summary modified.] 1050

The effect of 21 growth factors was studied. Certain concentrations of cysteine, magnesium, manganese, iron, lactate,  $\alpha$ -ketoglutarate, glutamate and glutamine, uracil, thymine, p-aminobenzoic acid, and 17- $\beta$ -oestradiol enhanced the growth of *V. fetus* when added to the basal medium. The results indicate that the slow growth rate of *V. fetus* in conventional mediums is partly due to certain deficiencies of the mediums.

I. Kovalenko, J. R. (1960). **Maladies des animaux, provoquées par Welchia perfringens et Cl. oedematiens. [Diseases of animals caused by Clostridium welchii and Cl. oedematiens.]**—Bull. Off. int. Epiz. 54, May pp. 115-133. [Summaries in English and Spanish.] 1051

II. Katitch, R. V. (1960). **Conceptions modernes de l'influence des facteurs hygiéniques sur l'apparition de certaines maladies à anaérobies des moutons. Diagnostic et immunoprophylaxie. [Influence of hygienic factors on outbreaks of Clostridium welchii infection in sheep.]**—Ibid. pp. 134-147. [Summaries in English and Spanish.] 1052

III. Thomson, A. (1960). **Diseases of animals caused by "Clostridium perfringens" and "Clostridium oedematiens".**—Ibid. pp. 164-



170. In English. [In French pp. 171-177.] 1053
- IV. Manninger, R. (1960). Entérite nécrasante infectieuse des porcelets à la mamelle. [Necrotic enteritis of piglets caused by *Clostridium welchii*.] — Ibid. pp. 178-180. 1054
- I. A review of diseases in sheep in the Soviet Union caused by the different types of *Cl. welchii* and by *Cl. oedematiens*, their diagnosis and control.
- II. Modern concepts on *Cl. welchii* enterotoxaemia in sheep are reviewed. Personal investigations indicated that infection by Type C organism may be spread by green fodder and, in its early stages, there is a toxæmia and a bacteraemia. Concentrated purified toxoid gave better immunity than formolized alum-precipitated vaccine. A polyvalent vaccine, for which good results are claimed, was prepared in Belgrade against Types C and D and against *Cl. oedematiens*.
- III. A brief discussion of research on the diseases and methods of prevention.
- IV. A general account.—T.E.G.R.
- Aikat, B. K. & Dible, J. H. (1960). The local and general effects of cultures and culture-filtrates of *Clostridium oedematiens*, *Cl. septicum*, *Cl. sporogenes* and *Cl. histolyticum*. —J. Path. Bact. 79, 227-241. 1055
- The authors have already described the action of *Cl. welchii* toxins on rabbits [V.B. 27, 1709]. Using the same methods they now describe the action of cultures and culture-filtrates of gas-gangrene organisms. Muscle necrosis caused by the various clostridia was very similar. Special attention was paid to the pathogenicity of *Cl. histolyticum*.—R.M.
- Willis, A. T. (1960). The lipolytic activity of some clostridia.—J. Path. Bact. 80, 379-390. [Author's summary.] 1056
- Evidence is presented which strongly supports the view that the confined opalescence and pearly layer produced by *Clostridium botulinum*, *Cl. sporogenes* and *Cl. oedematiens* type A growing on egg-yolk agar, are due to lipolytic activity and consist of free fatty acid. The opalescence and pearly layer are stained bright greenish-blue on application of copper sulphate solution. *Cl. welchii*, *Cl. bifermentans*, *Cl. sordellii* and *Cl. oedematiens* type B do not give these lipolytic reactions, although they produce a diffuse opalescence on egg-yolk agar as a result of their lecithinase C activity.
- Zemjanis, R. & Hoyt, H. H. (1960). The effect of enzyme inhibitors on *Vibrio fetus*, *Proteus vulgaris*, and *Pseudomonas aeruginosa*. — Amer. J. vet. Res. 21, 1066-1074. [Abst. from authors' discussion and summary.] 1057
- Nineteen enzyme inhibitors in various concentrations were compared with regard to their effect on the growth of *V. fetus*, *P. vulgaris*, and *Ps. pyocyanea (aeruginosa)*. The results are summarized in a table. All the 22 *V. fetus* strains employed were much more sensitive to the inhibitors than were the strains of proteus and pseudomonas.
- The greater resistance of proteus and pseudomonas to the inhibitors tested eliminates these substances as potential ingredients of selective medium intended for isolation of *V. fetus* from contaminated materials.
- Said, A. H. & Bouckaert, J. H. (1960). Orchitis—epididymitis in equines. A study of the disease as it occurs in Egypt. — Med. Veeartsenijschool Ghent 4, No. 1 pp. 27. [In English. Summaries in French, German and Flemish.] 1058
- In 25 cases, *Salmonella abortus-equi* was isolated from 11, *Staphylococcus aureus* from 4, *Streptococcus equi* from 2 and *Brucella melitensis*, *Br. abortus*, *S. paratyphi A*, *S. paratyphi B*, *E. coli* and *Corynebacterium pyogenes* from one each. Orchitis was produced experimentally by i/d injection of *S. abortus-equi* into the scrotum, but not by injection into the scrotal sac; further experiments indicated transmission by *Stomoxys calcitrans*.—E.V.L.
- ✓ Clarke, R. T. J. (1960). Rumen *Candida* species and bovine mastitis.—N. Z. vet. J. 8, 79. 1059
- During a survey of rumen yeasts, *Candida albicans* and *C. tropicalis* were isolated from the rumen of rumen-fistulated cows. Bovine yeast mastitis may occur as a result of infection from licking or sucking of the quarters of the udder or from contamination with the animal's own faeces.—A. ACKROYD.
- ✓ Eggert, M. J. & Romberg, P. F. (1960). Pulmonary aspergillosis in a calf.—J. Amer. vet. med. Ass. 137, 595-596. [Authors' summary modified.] 1060
- Portions of lungs, liver, and lymph nodes from a slaughtered 6-week-old male calf were submitted for laboratory examination because TB. was suspected. Part of this material was examined histologically, and the remainder was cultured on special medium. Both pro-



cedures indicated that this was a case of disseminated mycotic pneumonia caused by *Aspergillus fumigatus*, characterized grossly by the presence of numerous foci, resembling miliary TB., throughout the lung parenchyma. It is presumed that the infection resulted from the inhalation of spores in mouldy bedding.

This appears to be the first case of pulmonary aspergillosis in cattle to be reported since 1900. Of additional interest was the finding in histological sections of radiating club forms attached to the hyphae.

Vickers, C. L., Carll, W. T., Bierer, B. W., Thomas, J. B. & Valentine, H. D. (1960). **Pulmonary adenomatosis in South Carolina cattle.**—J. Amer. vet. med. Ass. 137, 507-508. 1061

In 9 herds of 296 cattle, 28 developed acute respiratory distress and 23 died. P.M. there was pulmonary emphysema, and microscopically hypertrophy and hyperplasia of the pulmonary epithelium. In 3 herds the disease was associated with feeding mouldy hay or mouldy sweet potatoes, and in others with grazing poor pastures containing dead grass. —M.G.G.

Bridges, C. H. (1960). **Maduromycosis of bovine nasal mucosa (nasal granuloma of cattle).**—Cornell Vet. 50, 468-484. [Author's summary modified.] 1062

B. reviewed the histopathology of three new cases and several previously reported cases of nasal granuloma of cattle in the U.S.A. The lesions contained both hyphae and chlamydospores of a fungus or fungi.

Based upon the occurrence of pigmented and non-pigmented chlamydospores and hyphae as well as the previous isolation of a species of *Helminthosporium*, already a recognized cause of such lesions in animals, they are classified as maduromycotic mycetomas or maduromycosis.

Hauser, H. (1960). **Tödlicher Streptopenicillinschock bei Papageien mit Lungenmykose. [Fatal reaction to streptomycin and penicillin in parrots with pulmonary mycosis.]**—Mh. VetMed. 15, 632-634. 1063

Nine parrots died within 20 min. after i/m injection of streptomycin and penicillin for "nasal catarrh". P.M. examination of 5 revealed granulomatous mycotic bronchopneumonia.—M.G.G.

Mastronardi, M. & Montemurro, N. (1960). **Su di un raro caso di blastomicosi a localizzazione mediastinica in un cane. [Mediastinal**

**blastomycosis in a dog.]**—Acta med. vet., Napoli 6, 312-335. [Summaries in English and French.] 1064

A growth occupied the medial portion of the thorax; lymph nodes in the area were enlarged. Ensuing anatomical changes within the thorax and histology of the tumour are described. Blastospores, sometimes in the budding phase, were observed in the tumour which was, therefore, considered to be due to a blastomycete. Epidemiology, pathogenesis and pathology of internal mycoses in general and of blastomycosis in particular are discussed.—T.E.G.R.

✓ Awad, F. I. (1960). **Studies on epizootic lymphangitis in the Sudan.**—J. comp. Path. 70, 457-463. [Author's conclusions modified.] 1065

An agar medium containing infusions of beef liver, lymph node, spleen, thiotone, glucose, sheep blood, penicillin and streptomycin supported a heavy growth of *Histoplasma farciminosum*. Unenriched Sabouraud's agar and blood agar were unsuitable.

Luxuriant yeast phase growth of the fungus was readily produced and maintained on the medium for over 3 months.

Incubation between 25° and 30°C. was optimal for growth.

An inhibitory effect of antibiotic-resistant bacteria was observed which explained the death of the organism in material stored at room temp. and confirms the need for collection of material in antibiotic solutions, refrigeration and prompt culturing as well as examination of fresh specimens.

The diphasic nature of *H. farciminosum* was confirmed.

✓ Walker, J. & Spooner, E. T. C. (1960). **Natural infection of the African baboon *Papio papio* with the large-cell form of *Histoplasma*.**—J. Path. Bact. 80, 436-438. [Authors' summary modified.] 1066

Apart from a single area of infection in an inguinal lymph-node, lesions were limited to the skin. The infection was apparently acquired in the Gambia, and the incubation period must have been at least three years.

✓ Green, H. F. (1960). **Streptothricosis in zebra and donkeys and demodectic mange in eland in Kenya.**—Vet. Rec. 72, 1098. 1067

Examination of dried skins revealed mild streptothricosis in zebra and donkeys, and demodectic mange in eland.—M.G.G.



- ✓ Catellani, G. (1960). Un caso di micosi in un bufalo. Isolamento di un micete della specie *Trichosporon pullulans*. [**Isolation of *Trichosporon pullulans* from a buffalo.**] — Acta med. vet., Napoli 6, 359-370. [Summaries in English and French.] 1068

The fungus was isolated from a subcutaneous abscess involving the spinous process of the third lumbar vertebra of a buffalo. It is considered that it gained entry through a skin wound.—T.E.G.R.

- ✓ Kelley, D. C. & Anthony, H. D. (1961). **Treatment of dermatomycoses in chinchillas.**—Vet. Med. 56, No. 1 pp. 23-24. [Authors' summary modified.] 1069

Data presented indicate that griseofulvin is a satisfactory drug to prevent and treat fungus infection caused by *Trichophyton mentagrophytes* in chinchillas. A dosage of 40 mg./kg. daily in the feed is satisfactory for treatment and prevention of the disease. No undesirable side effects were noted when a maximum of 80 mg./kg. of griseofulvin was given daily for 35 days.

- ✓ La Touche, C. J. (1960). **Mouse favus due to *Trichophyton quinckeanum* (Zopf) Macleod & Muende: a reappraisal in the light of recent investigations. IV.**—Mycopathologia 13, 33-47. [In English.] 1070

The macroscopic and microscopic features of *T. quinckeanum* growing on Sabouraud media and on natural media were described, with photographs. The microscopic features were considered insufficiently distinct from those of other species to warrant specific significance; inclusion of the fungus in the *Trichophyton mentagrophytes* group was proposed.—M.G.G.

- ✓ Lauridsen, O. (1960). Klinisk og farmakologisk undersøgelse af Actinodjin til behandling af strålesvamp hos kvaeg. [**Clinical and pharmacological tests of Actinodjin for treatment of actinomycosis in cattle.**] — Medlemsbl. danske Dyrægeforen. 43, 871-873. [In Danish.] 1071

Actinodjin (a 20% aqueous solution of trimethylaminopropanol-2-iodide) was used in 30 cases (tongue, 20; cheek, palate and pharynx, 5; glands, 3; jaw bones 2). The dosage for a 500 lb. cow was 50 ml., i/v or s/c. Jersey cows tolerated 40 ml. well by either route, and 50 ml. could be given on the third day. Results were much better than with potassium iodide, sulphadimidine or penicillin; but penicillin combined with

actinodjin treatment seems to increase the effect. Overdosage in a heifer (50 ml.) caused transient symptoms (inappetence, fever and after 8 days a scaly eczema). Of the tongue cases only two relapsed and needed further treatment. In the cheek and palate cases it was necessary to repeat the treatment up to 3 times. Of the glandular cases one was of 3 years' standing and even here healing occurred though the lymph nodes were not completely cleared. The bone cases showed improvement but the treatment was not continued.—F.E.W.

- Knowles, J. R. (1960). **Methods of control of contagious bovine pleuropneumonia utilised in Northern Nigeria with particular reference to Bornu Province.**—Bull. epiz. Dis. Afr. 8, 225-231. [Summary in French. Author's summary modified.] 1072

Bovine contagious pleuropneumonia has been endemic in Bornu Province for many years but the measures recently taken have limited its spread and reduced the foci. Spread is mainly by trade cattle and the sale of breeding cattle. Herd-to-herd contact is less important, except around Lake Chad when herds concentrate at certain seasons. Control measures depend on circumstances but two definite methods are available, *i.e.*, slaughter in sporadic areas and a long-term policy of centralized quarantine with vaccination in endemic areas. It is necessary to identify routes and control the movement and destination of cattle out of an infected area.

Vaccination can be of great value in outbreaks, if proper supervision is given, but a more stable vaccine is highly desirable for use in less accessible areas. Treatment must be undertaken with caution because of the possible production of carriers, but could be used as an inducement to the acceptance of rigorous control measures.

- Orue, J. & Mémery, G. (1960). La péri-pneumonie bovine. Précisions sur une nouvelle voie d'immunisation. Résultats. Conséquences et hypothèses. [**Immunization of cattle against pleuropneumonia in the muzzle.**] — Rev. Elev. 13, 161-174. [Summaries in English and Spanish.] 1073

Zebu cattle tolerated without reaction the injection of virulent lymph into the muzzle and were later immune to bovine pleuropneumonia. Non-humped cattle, however, tended to develop severe reactions to the injection. But in these animals an avianized strain (T3) injected into the muzzle was free



from risk and was more effective than by the s/c route.—M.G.G.

Konaté, I. (1960). Contribution à l'étude de la péripneumonie contagieuse des bovidés. Essai de traitement par la rovamycine et la sanclomycine-vitamine C. [**Contagious bovine pleuropneumonia and its treatment with spiramycin or a combination of tetracycline hydrochloride and vitamin C.**] — Thesis, Paris (Alfort) pp. 116. 1074

The bulk of this thesis is a general account of the disease. Native cattle in the French Sudan were treated. Three of five recovered after single oral administration of spiramycin (Rovamycin) at 100 mg./kg. body wt. Thirteen were injected i/m once or twice with tetracycline hydrochloride (0.1–1 g.) mixed with an unstated amount of vitamin C: five recovered, 7 improved in condition and regained appetite, and one was killed.—R.M.

See also absts. 1221 (disease eradication in Canada); 1223 (pulpy kidney disease in sheep); 1246 (diseases of bones and joints in pigs); 1238 (antibiotic treatment of poultry carcasses in relation to *S. typhi-murium*); 1309 (bovine mastitis); 1310 (report, C.S.I.R.O.); 1311 (report, Kenya); 1312 (report, British Guiana); 1313 (report, Bermuda); 1315 (book, biology of microorganisms).

## DISEASES CAUSED BY PROTOZOAN PARASITES

Anon. (1960). **Symposium on animal trypanosomiasis, Luanda, 1958. Inter-African Advisory Committee on Epizootic Diseases.** London: Commission for Technical Co-operation in Africa, South of the Sahara. (C.C.T.A./C.S.A.) Secretariat pp. 170. [Publication No. 45.] 1076

This contains reports by representatives from each country on the trypanosomiasis situation in French West Africa, Liberia, Sierra Leone, Ghana, Nigeria, Congo, Kenya, Uganda, Angola, Rhodesia, Nyasaland and Mozambique. There are references to cattle, sheep, goats, camels, horses, pigs, dogs, cats, also to tsetse-fly control and chemotherapy.

—R.M.

Desowitz, R. S. (1960). **Studies on immunity and host-parasite relationships. II. The immune response of antelope to trypanosomal challenge.** — Ann. trop. Med. Parasit. 54, 281–292. [Author's summary modified.] 1077

The course of infection, immune response and changes in serum-protein pattern after challenge with various species of trypanosome are described in antelope. Different species of antelope vary in susceptibility, some succumbing while others may be completely refractory.

Trypanolytic antibody has been demonstrated in antelope after challenge. A duiker inoculated with *Trypanosoma rhodesiense* and

de Santiago y Redel, E. (1960). Contribución al estudio de la microflora del contenido ingluvial de la gallina. [**Microflora in the contents of the crop of the fowl.**] — Arch. Zootec., Cordoba 9, 210–238. [Summary in English.] 1075

The microflora in the crop of 6 fowls aged 1–1½ years was studied over a period of 9 hours. Aerobes, anaerobes and lactobacilli were in higher concentration than fungi, coliforms and enterococci. Aerobes and lactobacilli and anaerobes increased up to the fourth, fifth and seventh hour respectively and then diminished. Coliforms and fungi decreased progressively and enterococci decreased slightly. There was a decrease in pH from 6 to 4.75—in correlation with the increase in anaerobes and lactobacilli and the decrease in coliforms and enterococci.

—T.E.G.R.

a gazelle with *T. brucei* produced high trypanolytic antibody titres, but low antibody titres were produced in antelope challenged with *T. vivax*. This difference may be due to the specificity of the antibody, the spectrum of antibody activity apparently varying with the species of trypanosome.

Whereas susceptibility to infection is inconstant, the alterations in the serum proteins are relatively consistent in pattern in the challenged animals. In all instances there was an increase in  $\beta$ 2- and  $\gamma$ -globulins following challenge.

Hawking, F. & Sen, A. B. (1960). **The trypanocidal action of homidium, quinapyramine and suramin.**—Brit. J. Pharmacol. 15, 567–570. [Authors' abst.] 1078

Homidium, quinapyramine, and suramin (Group II compounds) produce their trypanocidal effect *in vivo* only after a latent period of 24 hr. or more, during which time the trypanosomes may continue to multiply; this is in contrast to trivalent arsenical and diamidine compounds (Group I compounds), which begin to act immediately. Group II compounds also differ from Group I compounds in that (a) they have only a slight tendency to combine with trypanosomes, (b) they have little trypanocidal action *in vitro*, but (c) they make trypanosomes non-infective to fresh subinoculated mice. To explain these



features it is postulated that homidium, quinapyramine and suramin first combine in small amounts with some receptor on the trypanosome and then block some biochemical system which produces a hypothetical substance X which is needed for cell division of the trypanosome; the trypanosome is supposed to contain a preformed store of this substance X sufficient for several divisions to take place; and it is only when this store is exhausted that cell division is prevented and the trypanosome eventually dies.

Fussgänger, R. & Bauer, F. (1960). **Investigations on Berenil resistance of trypanosomes.** — Vet. Rec. 72, 1118-1120 & 1121. [Authors' summary modified.] 1079

Over a period of 44 weeks no indication of development of resistance occurred in a *T. congolense* strain subjected to 20 passages through Berenil-treated mice. One strain which as a result of the administration of another diamidine had become resistant in cattle to 5 times the usual curative dose of Berenil did not retain this resistance when further passed through Berenil-treated mice: the resistance was lost again completely after 13 passages within 36 weeks. These results appear to indicate that Berenil will not promote the development of resistant *Trypanosoma* strains even if subtherapeutic doses are administered continuously. This indicates that the various diamidines should not be considered as equal with regard to the induction of resistance of trypanosomes.

Anon. (1960). **Metronidazole in the treatment of trichomoniasis.** — Lancet, December 3rd, 1238-1239. 1080

A review of the literature. Trichomoniasis was cured in 83-96% of women and in 100% of men given metronidazole by mouth.—M.G.G.

Levine, N. D. & Mohan, R. N. (1960). ***Isospora* sp. (Protozoa: Eimeriidae) from cattle and its relationship to *I. lacazei* of the English sparrow.** — J. Parasit. 46, 733-741. [Authors' summary modified.] 1081

A species of *Isospora* with subspherical to spherical oocysts 27 by 25  $\mu$  in diam. was observed in the faeces of six beef cattle in Illinois. It was thought to be a new species, but a comparison with the oocysts of *I. lacazei*, the common coccidium of the English sparrow (*Passer domesticus*), revealed that the two forms were practically indistinguishable.

Siegmann, O. (1960). Die Beeinflussung des Futter- und Trinkwasserverbrauchs wachsender Küken durch Coccidieninfektionen. [Influence of coccidiosis on food and water consumption in growing chicks.] — Arch. Geflügelk. 24, 442-450. [Summary in English.] 1082

The consumption of food and water by chicks was not affected by latent experimental coccidiosis and decreased in only one of two groups with acute experimental *E. tenella* infection. Growth rate, however, was depressed in all chicks.—M.G.G.

Challey, J. R. (1960). **The effect of cecal coccidiosis infections and experimental hemorrhage upon adrenal ascorbic acid levels in the chicken.**—J. Parasit. 46, 727-731. 1083

An increase in ascorbic acid was observed in the adrenals of cockerels with acute *E. tenella* infection. This also occurred after removal of 30-60 ml. of blood by heart puncture. C. discussed the question of whether blood loss caused by coccidia was responsible for the increase in ascorbic acid. —R.M.

Stuart, E. E. (1960). **Coccidiosis vaccination.** —Avian Diseases 4, 305. 1084

On 4 poultry farms where coccidiosis was a problem, 10,000 chicks were given, at 4 days of age, sporulated oocysts of *Eimeria tenella*, *necatrix*, *maxima*, *hagani* and *acervulina* in the drinking water. The birds were reared without losses from coccidiosis although fed a coccidiostat for only the first 6 weeks. Of 177 culled birds that were used for challenge at 27 weeks of age, only a few developed lesions.—M.G.G.

Bool, P. H., Goedbloed, E. & Keidel, H. J. W. (1961). De babesia-soorten van het rund in Nederland: Babesia divergens en Babesia major. [The bovine babesia species in the Netherlands: Babesia divergens and Babesia major.]—Tijdschr. Diergeneesk. 86, 28-37. [In Dutch. Summaries in English, French and German.] 1085

A large parasite seen in blood smears from a cow that died of piroplasmiasis closely resembled *B. major*. The small babesia that is common in the Netherlands is more like *B. divergens* than *B. bovis*. The tick *Haemaphysalis cinnabarina* var. *punctata* occurs in the Netherlands and it could transmit *B. major*. There is a colour plate of blood smears.—R.M.



Barnett, S. F., Brocklesby, D. W. & Vidler, B. O. (1961). **Studies on macroschizonts of *Theileria parva*.**—Res. vet. Sci. 2, 11-18. [Authors' summary modified.] 1086

A series of measurements were made of the schizonts of *Theileria parva* in the hope that these criteria might be used in the differential diagnosis of the theilerial species. Macroschizonts had an average size of  $4.8 \mu$ , which was smaller than expected. They contained from 1 to 85 nuclei, with an average of 8. In autopsy smears there were from 4 to 760 schizonts per thousand lymphocytes, with an average of 264. The degree of parasitosis at death was not correlated with the duration of illness.

A plea is made for the use of the terms 'macroschizonts' and 'microschizonts' in place of the more traditional 'agamonts' and 'gamonts'.

Beverley, J. K. A. & Watson, W. A. (1961). **Ovine abortion and toxoplasmosis in Yorkshire.**—Vet. Rec. 73, 6-10 & 11. [Authors' summary modified.] 1087

Toxoplasma infection, as judged from a serological survey, is common in sheep in Yorkshire. Antibodies were found in higher titres in ewes which had aborted from unknown causes than in those lambing normally and those aborting from known causes. Toxoplasma was isolated from the brain or liver of 6 aborted or stillborn lambs from 39 ewes.

Harding, J. D. J., Beverley, J. K. A., Shaw, I. G., Edwards, B. L. & Bennett, G. H. (1961). **Toxoplasma in English pigs.**—Vet. Rec. 73, 3-5 & 6. [Authors' summary modified.] 1088

Toxoplasma was isolated from pigs in Worcestershire. The principal signs of illness were dyspnoea and wasting in piglets. Lesions and organisms were seen in the lung, liver, kidneys and lymph nodes of piglets and *Toxoplasma gondii* was recovered by mouse inoculation from the brain of the piglets' mother. Serum samples from apparently healthy pigs on the premises gave titres of from 0 to 1:72 in the Sabin-Feldman dye test.

Nobuto, K., Suzuki, K., Omuro, M. & Ishii, S. (1960). **Studies on toxoplasmosis in domestic animals. Serological response of cattle, goats and pigs to experimental infection and successful application of the complement fixation inhibition test to detect infected herds.**—Bull.

Nat. Inst. Anim. Hlth, Tokyo No. 40 pp. 29-52. [In English. Summary in Japanese.] 1089

Toxoplasms of feline or porcine origin were injected into 3 goats, 2 young cattle and 3 pigs; another 2 pigs were each fed on 6 infected mice. Symptoms and the results of repeated dye tests and c.f. tests are given.

In addition 213 sera from goats in central Japan were examined. One reacted to the c.f. test at a titre of 1:16 and to the dye test at 1:1,024.

A complement fixation inhibition (c.f.i.) test was described. Serum was heated at 60°C. for 20 min. to eliminate non-specific reactions and diluted with a soln. of Ca, Mg and Na chlorides. Serum dilutions and antigen were mixed and incubated for an hour. Serum from immune g.pigs ("indicator serum") was added, then complement, and the mixture was held at 4°C. overnight. After this, sensitized red cells were added and the result was read after incubation for 30 min. The c.f.i. test appeared to be suitable for sera from pigs and cattle, while the ordinary c.f. test was suitable for goat sera. Eighteen pigs aged two months from two farms on which losses had been caused by a febrile disease were examined: sera from 7 affected pigs reacted to both tests, so did sera from 4 of 11 apparently healthy pigs. Another 3, from which toxoplasms were recovered, reacted to the dye test but not to the c.f.i. test. An incidental finding was toxoplasms in the eye of a blind pig. Abortion and stillbirth of unknown cause in sows were investigated and dye and c.f.i. tests were strongly positive in 4 of 6 sows: toxoplasms were isolated from the lung of one.—R.M.

Koestner, A. & Cole, C. R. (1960). **Neuropathology of porcine toxoplasmosis.**—Cornell Vet. 50, 362-384. [Authors' summary modified.] 1090

Eight naturally infected and 24 experimentally infected pigs were examined. Seventeen had lesions in the c.n.s. characteristic for toxoplasma infection. In nine the organism was confined to the brain. The disease spread by way of the vascular system. The lesions therefore were perivascular and consisted of focal necrosis in acute infections and of glial nodules and scars in the chronic disease. Brain lesions were similar to those described in other species; they are distinguishable from lesions caused by organisms other than toxoplasma.



Groulade, P., Vallée, A. & Levaditi, J. C. (1960). Un cas de toxoplasmose miliaire diffuse chez le chien. [**Diffuse miliary toxoplasmosis in a dog.**] — Bull. Acad. vét. Fr. 33, 247-252. 1091

An account is given of acute diffuse miliary toxoplasmosis in a dog aged 7 months. The organisms were present in the lungs, liver and spleen and the disease was characterized by leucopenia with neutrophile granulocytosis. The organism was isolated by i/p injection of spleen suspension in mice. It is considered that this form of the disease plays an important part in the transmission of toxoplasmosis in dogs which are, possibly, an

important natural reservoir of infection. —T.E.G.R.

Woodworth, H. C. & Weinman, D. (1960). **Studies on the toxin of toxoplasma (toxotoxin).** — J. infect. Dis. 107, 318-324. [Authors' summary modified.] 1092

Toxoplasma toxin was obtained from mice and cortisone-treated rats, but not from embryonated eggs. The potency of crude toxin was increased as much as tenfold by heating at 56°C. The toxic activity was recovered with certain globulin fractions by ammonium sulphate precipitation, indicating intimate association of the toxin with these proteins.

See also absts. 1310 (report, C.S.I.R.O.); 1311 (report, Kenya); 1312 (report, British Guiana); 1313 (report, North Borneo).

### DISEASES CAUSED BY VIRUSES AND RICKETTSIA

Van Bakkum, J. G. (1960). **A serological analysis of the results of the Dutch foot-and-mouth disease control program.**—Bull. Off. int. Epiz. 54, May pp. 372-377. [In English. Summary in French.] 1093

Vaccination against F. & M. disease was first applied in Holland, on an experimental scale, in 1942. Field vaccination, started in 1944, was interrupted by war conditions and resumed in 1948. Virus was produced in live cattle until 1952 and thereafter on tongue tissue culture, according to the method described by Frenkel. The dose of the monovalent formalized adsorbed vaccine is 15 ml., containing  $12 \times 10^6$  cattle I.D.<sub>50</sub>. Immunity was confirmed by exposure to infection. In adult cattle antibodies appear 3-6 weeks after vaccination; the titre diminishes appreciably towards the 4th-5th month and more slowly up to the 6th month. On re-vaccination there is a marked rise in titre after a week which may persist for over a year. Calves are first vaccinated at 10-12 months, as a rule. Vaccination associated with veterinary police measures is considered an effective method of control.—T.E.G.R.

Heinig, A. & Röhrer, H. (1960). Über Untersuchungen an atypischen Maul-und-Klauen-seuche-Epizootiestämmen des Jahres 1959. [**Studies on atypical strains of foot and mouth disease virus isolated from epidemics during 1959.**]—Arch. exp. VetMed. 14, 904-917. 1094

The authors received for identification two atypical strains of virus from cattle in Roumania. One strain and 7 further strains from Roumania and 12 from Bulgaria proved

to be variants of Type O<sub>2</sub>. The other strain and a further strain from Bulgaria proved to be Type A variants. Their immunological properties and behaviour in cell cultures were studied; their epidemiological importance was discussed.—R.M.

Hess, W. R., Bachrach, H. L. & Callis, J. J. (1960). **Persistence of foot-and-mouth disease virus in bovine kidneys and blood as related to the occurrence of antibodies.**—Amer. J. vet. Res. 21, 1104-1108. [Authors' summary modified.] 1095

In calves experimentally infected with F. & M. disease virus, viraemia existed during the first two days after inoculation. By the fourth day, detectable amounts of neutralizing antibodies were present; virus was no longer found in the blood. Virus persisted in the kidneys for at least six days and there was evidence that this virus might be located intracellularly.

Compagnucci, M. (1960). Ricerche in bovini produttori d'infravirus dell'afra epizootica. Nota III. Comportamento del lisozima serico e salivare. [**Production of foot and mouth disease virus in cattle. III. Lysozyme in the serum and saliva.**] — Zooprofilassi 15, 415-422. 1096

There was an increase in the lysozyme content of the serum of cattle infected with foot and mouth disease virus—average 50.4 F.U. (Fleming units) compared with 36.9 F.U. in non-infected cattle. The saliva of infected and non-infected cattle did not contain titratable quantities of lysozyme.—T.E.G.R.



Veckenstedt, A. (1960). Zum Problem der Anpassung des Maul-und-Klauenseuche-Standard-A-Virus an das Zentralnervensystem der Maus. V. Mitteilung: Abhängigkeit von Anpassungsgrad und Auftreten von komplementbindendem Antigen. [**Adaptation of Type A foot and mouth disease virus to the central nervous system of mice. V. Degree of adaptation and occurrence of complement-fixing antigen.**] — Arch. exp. VetMed. 14, 939-946. 1097

Previous communications in this series dealt with changes in infectivity and pathogenic properties of the virus during adaptation to the c.n.s. In the present article the author found that changes in c.f. properties were closely related to changes in infectivity and pathogenicity.—R.M.

Strohmaier, K. & Geiss, E. (1960). Die Inaktivierung des Virus der Maul- und Klauenseuche durch monochromatisches ultraviolette Licht. [**Inactivation of foot and mouth disease virus by monochromatic ultraviolet light.**] — Zbl. Bakt. I. (Orig.) 180, 166-175. [Summaries in English, French, Spanish and Russian. English summary modified.] 1098

Cultured virus was irradiated with the wave lengths of 248, 254, 265, 270, 280 and 297 m $\mu$  of different doses, for between 10 and 110 min., and the length of exposure needed to kill the virus was determined. Inactivation was quickest at a wave length of 265.

Bachrach, H. L. (1960). **Ribonucleic acid of foot-and-mouth disease virus: its preparation, stability, and plating efficiency on bovine-kidney cultures.** — Virology 12, 258-271. [Author's summary modified.] 1099

The best yields of infectious ribonucleic acid (RNA) from F. & M. disease virus, type A on calf-kidney cultures were obtained with cold phenol at low ionic strength in the presence of EDTA and sodium dodecylsulphate. One extraction with phenol was sufficient to destroy all ribonuclease (RNAase)-resistant virus particles and gave the maximum yield of RNA. The isolated RNA was completely stable to storage at  $-196^{\circ}\text{C}$ . but not at  $4^{\circ}$ ,  $-12^{\circ}$  and  $-50^{\circ}\text{C}$ . It was more stable than the virus itself to acid and alkaline conditions from pH 3 to 11.5. When acidified to pH 4.1 in the absence of RNAase, the virus did not appear to split off infectious RNA. There was a linear relationship between plaque counts in tissue culture and the dilution of RNA applied, and replicate

platings produced a Poissonian distribution of plaque counts. The plating of RNA was considerably more efficient when small-sized (*i.e.*, 0.1 ml.) inocula were used than when the same amount of RNA was applied in larger volumes. Under such conditions the infection of culture cells appeared to be rapid, *i.e.*, as many plaques were formed when the agar overlay was applied 1 min. after plating RNA as when applied at later times.

Kobusiewicz, T. (1960). Recherches complémentaires sur le vaccin chinolé de la fièvre aphteuse en Pologne. [**A chinol vaccine for foot and mouth disease in Poland.**] — Bull. Off. int. Epiz. 54, May pp. 368-371. 1100

The percentage composition of the vaccine is: virulent material, 3; glycerol, 10; aluminium hydroxide, 40. Formol is added and the vaccine is inactivated at  $25^{\circ}\text{C}$ . for 24 hours. As the virulent material is not filtered 0.1% chinol is added to destroy possible bacterial contaminants (the bactericidal action of chinol against tubercle bacilli, brucella and anaerobes was confirmed bacteriologically and biologically). The vaccine, in doses of 3-5 ml., confers an immunity lasting 5 months. A dose of 1 ml., intradermally or submucosally, engenders immunity, after 5 days, lasting 2 months in the case of Type A and less in the case of Type O.—T.E.G.R.

Tepper, I. (1960). Vzpánutie Aujeszského choroby v jednom spoločnom chove hovädzieho dobytku. [**Outbreak of Aujeszký's disease in cattle.**] — Vet. Čas. 9, 425-431. [In Slovak. Summaries in English, French, German and Russian.] 1101

T. described an outbreak of Aujeszký's disease in a herd of 110 young beef cattle. Within five days five heifers and three bullocks died. The virus was demonstrated in parenchymatous organs and nervous tissues of dead animals by rabbit inoculation, and in saliva but not blood from live animals with clinical symptoms. After the last death, all cattle and pigs on the farm were immunized, but four weeks later there was an outbreak in pigs. The virus was isolated from aborted foetuses. Rats were believed to have acted as carriers.—E.G.

Grillo Torrado, J. M. & Giacosa de Crescini, A. M. (1960). Obtención de sueros antirrábicos por medio de dos aplicaciones vacunales y su comparación con un método de descargas múltiples. [**Antirabies serum**

from horses inoculated with two doses of chloroform treated rabies vaccine.] — Rev. Invest. Ganad. No. 8 pp. 67-78. [Summaries in English and French.] 1102

The vaccine described by Kelar was used on 22 horses in varying initial doses and at varying intervals for the production of high titre rabies immune serum with only 2 doses. The sera were titrated by c.f. and neutralization tests. With 2 doses (5-20 ml. and 20 ml.) at an interval of 2 months c.f. titres were equal to or higher than those obtained at the Tuscan Serum and Vaccine Institute of Siena, Italy, where multiple vaccination at varying intervals is practised. When the interval between doses was 4 months the ratio of neutralization titres was 1:2.5 in favour of the Tuscan method; this difference is not considered significant. It is recommended that neutralizing antibody response should be studied after 3 conveniently spaced doses and compared with that in the Tuscan method in which, it is considered, antigen saturation occurs.—T.E.G.R.

Fenje, P. (1960). A rabies vaccine from hamster kidney tissue cultures: preparation and evaluation in animals. — Canad. J. Microbiol. 6, 605-609. [Author's abst. modified.] 1103

A strain of fixed rabies virus adapted to hamster kidney tissue cells has produced culture fluids of high infectivity for rabbits and mice. These culture fluids were rendered non-infective by treatment with formaldehyde at a concentration of 0.008 M. Rabbits immunized with this material produced anti-rabies antibody to a high titre and later resisted i/m inj. of rabies virus from the salivary glands of a fox.

McClenaghan, R. J. (1960). The role of vaccine therapy against rabies in animals.—Canad. J. publ. Hlth 51, 349-352. [Summary in French.] 1104

Dogs are vaccinated free of charge in Canada. Requests for vaccination of cattle and other livestock have been refused because of lack of effective vaccine for cattle.—R.M.

Prier, J. E. & Sauer, R. M. (1960). A pox disease of monkeys. — Ann. N. Y. Acad. Sci. 85, 951-959. [Authors' summary modified.] 1105

A pox disease that has appeared in laboratory monkeys in at least two parts of the world is reviewed. The virus is a member of the variola-vaccinia group and affects both

*Macaca mulatta* and *M. philippinensis* (cynomolgus) species. Not enough information is available to establish firmly its relationship to other members of the variola-vaccinia group.

Woodroffe, G. M. & Fenner, F. (1960). Genetic studies with mammalian poxviruses. IV. Hybridization between several different poxviruses. — Virology 12, 272-282. [Authors' summary.] 1106

During experiments on reactivation of heat-inactivated pox viruses, several clones of virus were recovered which appeared to be hybrids between the two types of pox virus used. Hybrids were recognized only with viruses belonging to the same subgroup. Within the vaccinia subgroup hybridization appeared to be more common with the more closely related viruses.

A probable hybrid was recovered from a reactivation experiment with myxoma and fibroma. The difficulties of using virulence as a genetic marker are stressed.

Grešíková, M., Havránek, I. & Görner, F. (1960). Vplyv pasterizácie na infektivitu vírusu klieštovej encefalitidy. [Effect of pasteurization on infectivity of tick-borne encephalitis virus in milk.] — Vet. Čas. 9, 462-469. [In Slovak. Summaries in English, French, German and Russian.] 1107

Irrespective of its concentration in experimentally infected cows' and goats' milk, tick-borne encephalitis virus was killed within 10 sec., at temp. of 72°C.—E.G.

Morgan, C., Howe, C. & Rose, H. M. (1961). Structure and development of viruses as observed in the electron microscope. V. Western equine encephalomyelitis virus.—J. exp. Med. 113, 219-234. [Authors' summary modified.] 1108

Stages in the development and release of the virus are illustrated (in 15 plates) and described. It is suggested that precursor particles 22 mμ in diameter differentiate at template sites close to membranes bordering cytoplasmic vacuoles and that these particles either pass into the lumen of the vacuole, acquiring in the process a coat and peripheral membrane, or are dispersed in the cytoplasm and extruded through the cellular wall, emerging as viral particles on the surface. Although necrosis and dissolution of the cell with release of contents, including virus, may intervene at any stage of infection, ejection of virus from the vacuoles can presumably occur without rupture of the cell.



Holden, P., Solomon, G. C. & Blackmore, J. S. (1960). **Use of chicks for detecting Western equine and St. Louis encephalitis viruses in mosquitoes.** — Amer. J. vet. Res. 21, 1078-1083. [Authors' summary modified.] 1109

Newly hatched chicks were as sensitive as newly weaned mice to infection with Western equine encephalomyelitis (WEE) and St. Louis encephalitis (SLE) viruses. Chicks infected with WEE virus within 12 hours after hatching developed typical signs of disease followed by death. Inapparent infections, detectable by the haemagglutination-inhibition test, usually resulted in older chicks given WEE virus or in chicks of any age given SLE virus.

H.I. antibodies were not detected in chicks inoculated with normal mouse brain or in chicks held as normal controls in common rearing cages with chicks infected with the viruses.

Twelve-hour-old chicks were used to test for encephalitis viruses in 219 mosquito pools containing 7,265 *Culex tarsalis*, and for comparison, duplicate portions of each mosquito preparation were also inoculated into mice aged 3-4 weeks. In both testing procedures, seven mosquito pools were found to contain SLE virus; one contained WEE virus. A single additional pool yielded both viruses.

Reháček, J. (1960). Ovlivnění infekčnosti klíšťat nasáním neutralizačních protilátek proti virusu severoamerické encefalomyelitidy koní východního typu (EEE) na imunních hostitelích. [**Neutralization of Eastern equine encephalomyelitis virus with ticks engorged on immune animals.**]—Vet. Čas. 9, 596-600. [In Czech. Summaries in English, German and Russian.] 1110

In female *Ixodes ricinus*, allowed to feed on mice immunized against Eastern type equine encephalomyelitis, and kept at 25°C., neutralizing antibodies were demonstrable for about 12 days after the blood meal. Virus neutralization also appeared to take place in the digestive system of ticks engorged partly on immune and partly on viraemic hosts. Similarly, partial or complete virus neutralization was demonstrated in suspensions prepared from pools of ticks collected from both immune and infected animals.—E.G.

Chappell, W. A. (1960). **Animal infectivity of aerosols of monkey B virus.** — Ann. N. Y. Acad. Sci. 85, 931-934. [Author's summary modified.] 1111

Of five species of animals exposed to

aerosols of monkey B virus, rabbits, monkeys, and g.pigs are susceptible, rabbits being the most susceptible.

It appears that the immunity of monkeys may be counteracted by monkey B virus if the dose administered is large enough. Stimulation of antibody production seems to occur when monkeys inhale sublethal doses of B virus. B. virus was isolated from saliva and blood before the death of an infected monkey and was isolated from ten tissues after death. [There are three other papers about B virus infection, on pages 960, 970 and 980.]

Hurlbut, H. S. & Thomas, J. I. (1960). **The experimental host range of the arthropod-borne animal viruses in arthropods.** — Virology 12, 391-407. [Authors' summary modified.] 1112

Thirteen selected arthropod-borne animal viruses were introduced parenterally into 1 arachnid, and 8 insects representing 6 orders. Serial passages were attempted with these 117 combinations and were successful, indicating propagation, in 58 of them. In some cases the viruses survived in individual arthropods for many months through moulting and metamorphosis without apparent injury to the host. An affinity of the viruses for the central nervous system of the arthropod was observed.

These viruses evidently have a high potential for propagating themselves in a variety of arthropods, but this gradually diminishes as one passes from group A through group B, and becomes very restricted in certain of the group B viruses and in certain viruses not of these two groups. A theory is proposed that this is an evolutionary gradient starting with an ancestral type of wide host range and ending with those closely adapted and restricted to certain hosts.

Itikawa, O., Hayakawa, T. & Shibata, T. (1960). **Cytochemical studies on equine infectious anaemia. VI. Relationship between microincineration and emission spectrograph in hepatic and splenic haemosiderosis.**—Bull. Nat. Inst. Anim. Hlth, Tokyo No. 40 pp. 77-88. [In English. Summary in Japanese.] 1113

The iron content of liver and spleen in 345 horses with equine infectious anaemia corresponded with the authors' previous histochemical classification of haemosiderosis, except those with hyposiderosis of spleen and liver, in which the iron content of spleen was high because of congestion and haemorrhage.

—M.G.G.

Brown, R. D. & Scott, G. R. (1960). **Diagnosis of rinderpest by lymph node biopsy.**—Vet. Rec. 72, 1055-1056. [Authors' summary.] 1114

Biopsy samples of lymph nodes of cattle infected with rinderpest were tested for diffusible rinderpest antigens by the agar gel double-diffusion precipitation technique. Positive samples were obtained on the first to the eighth day after the start of the fever. The highest percentages of positives occurred in samples taken on the third to the fifth day. The implications of the technique for confirming rinderpest in the field are discussed.

Stone, S. S. (1960). **Multiple components of rinderpest virus as determined by the precipitin reaction in agar gel.**—Virology 11, 638-640. 1115

In agar gel precipitin tests, two lines were formed between the cups containing rabbit anti-rinderpest serum and unheated rinderpest virus antigen consisting of the middle layer of centrifuged homogenized mesenteric lymph nodes from steers infected with the Pendik strain. Only one line could be seen between the antiserum and cups containing heated antigen. Starch-block electrophoresis also showed two distinct particles with differing electrophoretic mobility.—A. ACKROYD.

Gilbert, Y., Mornet, P. & Goueffon, Y. (1960). **Comportement humoral du boeuf et du lapin envers l'inoculation de virus de Carré: ses rapports avec l'immunisation contre le virus bovinepestique normal ou modifié. [Reaction of cattle and rabbits to inoculation of distemper virus and their immunity to normal or lapinized rinderpest virus.]**—Bull. Acad. vét. Fr. 33, 305-315. Discussion: p. 316. 1116

The immunity against rinderpest engendered in cattle by distemper virus is the result of infection by this virus and is manifested by the appearance of neutralizing antibodies and conforms to the "all or nothing" law; there is no "partial resistance". It has a long duration and is similar to that conferred by attenuated rinderpest viruses. The rabbit seems to be resistant to the distemper virus and cannot be immunized against lapinized rinderpest virus by this method.—T.E.G.R.

Plowright, W., Ferris, R. D. & Scott, G. R. (1960). **Blue wildebeest and the aetiological agent of bovine malignant catarrhal fever.**—Nature, Lond. 188, 1167-1169. 1117

The authors investigated the role of the blue wildebeest (*Gorgon taurinus*) in the

epidemiology of bovine malignant catarrh in Kenya. The causal agent was isolated from these animals and passaged in cattle, rabbits and in tissue culture. Evidence is presented that this agent is a virus, capable of passing a collodion filter of 430 m $\mu$  pore size. Five isolates of the virus were made from 35 wildebeest. In cattle, the recovered virus produced the pathological and haematological changes which typify the 'head-and-eye' form of the disease. One isolate was maintained for more than 20 serial passages in cattle. Virus was regularly recovered by culturing, as monolayers, the thyroid tissue of infected cattle. The cytopathic changes in the cultures were characterized by syncytia and Type A intranuclear inclusions. An identical cytopathogenicity was found in similar cultures of adrenal glands. The cells of primary sheep thyroid, calf testis or adrenal, rabbit and wildebeest kidney were all susceptible to the virus once it had been isolated in thyroid cultures. Cell-free virus was not demonstrable in the tissues of infected cattle.

Five isolates were serially passed 14-38 times in an established line of calf kidney cells. Three of the five remained fully pathogenic for cattle up to the 10th-19th passage.

It was considered that the virus resembled members of the herpes virus group, both in cytopathology and epidemiology. Like the viruses of varicella and herpes zoster, it failed to produce free virus in early culture passages—differing, however, in that all tested isolates did so later.—J. H. DARBYSHIRE.

Matthias, D. (1960). **Die Bedeutung des Bornavirus für die Ätiologie des bösartigen Katarhalfiebers des Rindes. [Role of Borna virus in the aetiology of bovine malignant catarrh.]**—Mh. VetMed. 15, 643-646. 1118

Clinical Borna disease was induced in 8 of 58 young cattle by an intracerebral injection of Borna disease virus and weekly i/v injection of *Escherichia coli* vaccine. Clinical and P.M. observation revealed no symptoms or lesions characteristic of bovine malignant catarrh.—M.G.G.

Moll, T. & Davis, A. D. (1960). **Serologic relationship between bovine enteroviruses and infectious bovine rhinotracheitis virus.**—Amer. J. vet. Res. 21, 1131-1132. 1119

The data presented indicate a serological relationship between two strains of bovine enterovirus and the virus of infectious bovine rhinotracheitis. The enterovirus was inhibited by infectious bovine rhinotracheitis immune



sera prepared in rabbits, but the rhinotracheitis virus was not inhibited by immune sera against either of the enterovirus strains. This indicated that the rhinotracheitis virus contained one or more cross-reacting antigenic components not present in the enterovirus strains. These results also imply that immunization of animals against infectious bovine rhinotracheitis would also afford protection against possible ill-effects from some bovine enterovirus infections.—F.E.W.

Šetka, R. & Hintinaus, J. (1960). Virusový zánět varlat býků. [**Virus orchitis in bulls.**] —*Veterinářství* 10, 423-426. [In Czech.] 1120

A form of virus orchitis in bulls, associated with infertility, was described. The disease was characterized by relaxation of the cremaster muscle, painless swelling of the spermatic cord, testis and epididymis, enlargement of seminal vesicles and, not infrequently, of the prostate gland. In the later stages the testicles were softened and atrophied and there was adhesion between the visceral and parietal layers of the tunica vaginalis. Heifers developed purulent vaginitis, cervicitis or endometritis 3-5 days after infection. In cows the infection was generally somewhat milder. Incidence of cystic ovaries was high. Early embryonic death was suspected. The disease was reproduced in healthy bulls and heifers using semen or testicular suspension from infected bulls, or virus of the second to fourth chick embryo passage. In one insemination centre 21 of 22 bulls had lesions and the semen of the remaining, apparently healthy one, was infective. [See also *V.B.* 30, 1424]. —E.G.

Kennedy, P. C., Olander, H. J. & Howarth, J. A. (1960). **Pathology of epizootic bovine abortion.** — *Cornell Vet.* 50, 417-429. [Authors' summary modified.] 1121

A form of seasonal epizootic abortion occurs in California mainly in heifers taken into the foothills and mountains. Abortion occurs during the last three months of pregnancy. The foetal response to this disease is a focal or diffuse granulomatous change which may involve all organs. Macroscopically these fetuses have a generalized lymphoid enlargement, a coarsely nodular liver, and multiple submucosal haemorrhages.

Storz, J., McKercher, D. G., Howarth, J. A. & Straub, O. C. (1960). **The isolation of a**

**viral agent from epizootic bovine abortion.**—

*J. Amer. vet. med. Ass.* 137, 509-514. 1122

In California 5 strains of a virus apparently of the psittacosis-lymphogranuloma group were isolated from aborted fetuses in herds with epidemic abortion. They produced elementary bodies in chick embryos and the lungs of mice. Parenteral injection into cattle caused fever, with abortion up to 126 days later.—M.G.G.

French, E. L. (1959). **The isolation of *Miyagawanella bovis* from calves in Victoria.**

—*Aust. vet. J.* 35, 267-268. 1123

Suspensions were made of faeces from apparently healthy calves. The coarse material was removed by centrifugation, and g.pigs were inoculated i/p with the supernatant to which streptomycin had been added. An emulsion of liver and spleen of reacting g.pigs was inoculated into the yolk sac of chick embryos, and a serological test made using an antigen prepared from infected yolk sacs. The reactions of the g.pigs, the results of the yolk sac inoculations and the serological test support a diagnosis of infection with an organism of the psittacosis-lymphogranuloma group.—A. CULEY.

Butler, W. F. (1960). **Treatment of bovine cutaneous papillomata with autogenous vaccine.**—*Vet. Rec.* 72, 1016 & 1017. [Author's summary.] 1124

A small-scale controlled clinical trial using autogenous vaccine is described. The results seem to indicate the value of the method which is simple to apply. A single dose is effective: 2 g. or more of tissue per 60 ml. of glycerol-saline are used.

Lansade, P. (1959). Contribution à l'étude de l'ecthyma contagieux du mouton. Traitement par le chloramphénicol. [**Chloramphenicol treatment of contagious ecthyma of sheep.**] —Thesis, Paris (Alfort) pp. 45. 1125

Chloramphenicol gave good results in the treatment of contagious ecthyma in 12 flocks of sheep and lambs. Two or three local applications were usually sufficient. I/m or i/v treatment was suitable for cases with complications.—M.G.G.

Payne, J. M. & Belyavin, G. (1960). **The experimental infection of pregnant rats with the virus of enzootic abortion of sheep.**—*J. Path. Bact.* 80, 215-223. [Authors' summary modified.] 1126

Pregnant rats are susceptible to intraperitoneal or intravenous infection with the

"Moredun" strain of the virus grown in the yolk-sac of embryonated hen eggs. In contrast, non-pregnant rats are resistant to infection.

The most constant lesions occurred in the placenta, where chorionic trophoblast cells became laden with accumulations of elementary bodies; subsequent breakdown of these cells led to abscess formation. Other changes included haemorrhage and necrosis in the placenta, liver necrosis and gross splenic enlargement. Many rats and foetuses died.

The virus was also passaged serially in pregnant rats by the i/p inj. of suspension of infected placenta.

It is suggested that the susceptibility of the pregnant rat is due to the presence of placental tissue, which allows the virus to establish itself. Such a phenomenon may find further useful application in virology.

Okaniwa, A. & Ishitani, R. (1960). [Pathology of swine fever. II. Histopathology of the central nervous system in pigs inoculated with virulent virus. III. Histopathology of spleen and lymph nodes. IV. Histopathology of liver, kidneys and lungs. V. Lesions in naturally infected pigs.] — Bull. Nat. Inst. Anim. Hlth, Tokyo No. 40 pp. 89-101; 103-114; 115-125 & 127-140. [In Japanese. Abst. from English summaries.] 1127

Sixty-eight pigs were killed between 1 and 6 days after inoculation of 10 or 100 thousand minimum lethal doses of virus. The most prominent change in the central nervous system was perivascular cuffing in brain, meninges and choroid plexus, although form and distribution of lesions differed widely in individual pigs at each stage of the disease. Among 60 pigs killed on the 5th or 6th days severe encephalitis was present in 19 and moderate encephalitis was present in 33.

Spleen lesions consisted of necrosis of parenchyma and blood vessels, haemorrhages in the follicles, and proliferation of reticulum cells in the red pulp. The extent of lesions was related to severity and duration of infection. This did not apply to lymph nodes, for the lesions varied in different nodes and in different animals.

In the liver, activation of the reticulo-endothelial system was the most prominent change. In kidney and lung haemorrhages were the commonest lesion. In general the authors' findings concerning lesions and pathogenesis agreed with the findings of previous workers.

For the study of infection acquired spontaneously, 102 pigs which died or were slaughtered were examined. Lesions were similar to those in experimentally infected animals except that necrosis in spleen and lymph nodes was less severe. It was concluded that the best tissues to examine histologically for diagnostic purposes were c.n.s. and spleen. This series of papers is accompanied by eight plates of photomicrographs.

—R.M.

Pogonyailo, G. F. & Teryukhanov, A. B. (1960). [Comparison of immunity in pigs inoculated with crystal violet or lapinized vaccines and challenged by inhalation of swine fever virus.] — Veterinariya, Moscow No. 10 pp. 33-35. [In Russian.] 1128

Fourteen pigs aged between 6 and 10 months were inoculated twice with glycerinized crystal violet vaccine and 37 were inoculated with the ASV strain of lapinized virus vaccine. At various intervals after inoculation some were placed singly in a chamber of 2.25 cubic metres capacity and exposed for 20-25 min. to an aerosol of 22.5 ml. of dried virus in 10 parts of normal saline, or to a dust composed of one part dried virus and four parts of talc. Of the pigs inoculated with crystal violet, 11 were challenged by inhalation 2.5 or 3 months later, and only two resisted.

Of the pigs inoculated with lapinized virus (with or without immune serum at the same time), 26 were challenged by inhalation and all except one resisted infection.—R.M.

Goret, P., Fontaine, M., Brion, A., Pilet, C., Girard, M. & Legrand, P. (1960). Effets du chlorhydrate de tétracycline administré par différentes voies sur la prévention et le traitement de la pneumonie à virus du porc. [Tetracycline hydrochloride in the prevention and treatment of virus pneumonia in pigs.] — Bull. Acad. vét. Fr. 33, 303-304. 1129

General conclusions of work to be published in detail later. The antibiotic, added to the diet in doses of 15 mg. or less/kg. live weight, was ineffective against virus pneumonia of pigs; at 10-15 mg./kg. it prevented the retardation of growth. Treatment for 21 days prevented retardation of growth in healthy pigs introduced into infected herds and enabled infected pigs to make good the loss of weight gain. Injection of an oily suspension had little or no effect; injection of an aqueous suspension at the time of exposure, may prevent infection but leaves the pigs particularly susceptible. The parenteral route



was less effective than the oral for combating weight loss. Immunity is similar to that resulting from repeated attacks of chronic disease and is engendered by persistence of the virus. Antibiotic treatment results indirectly in premunition by checking the course of infection and the spread of the lesions without causing their complete disappearance.

—T.E.G.R.

Gillespie, J. G. (1960). **Comparison of immune response to distemper produced by intravenous inoculation and by aerosol exposure.**—*Cornell Vet.* 50, 514-518. [Author's summary.] 1130

Maternally transferred antibodies interfered with the development of active immunity against distemper whether virus was given intravenously or by aerosol exposure.

Bech, V. (1960). **Relationship between complement fixing antibodies against measles virus and canine distemper virus.**—*Acta path. microbiol. scand.* 50, 331-334. [In English.] 1131

C.f. antibody titres against dog distemper antigens were demonstrated in 4 of 5 patients with measles. They were 8 to 32-fold lower than the measles antibody titres. Four years later the measles antibody titres were level with or only two fold higher than the distemper antibody titres. In 5 people with a history of measles and in 9 with no such history, distemper antibody titres were identical with or twofold lower than measles antibody titres.—M.G.G.

Heller, L. A. & Salenstedt, C. R. (1960). **One-sided immunologic relation between adenovirus and infectious canine hepatitis antigens.**—*Virology* 11, 640-645. 1132

In complement-fixation (c.f.) tests on 111 random human sera, a high degree of correlation was noted between titre values against adenovirus and canine virus hepatitis (CVH) antigens, and in paired sera from virologically verified cases of adenovirus infection simultaneous rises in c.f. titres against both antigens were observed. When random dog sera were screened against the 2 antigens, no cross-relationship was demonstrable. Experimental infection of 2 puppies and 8 g.pigs with CVH resulted in the appearance of homologous c.f. antibodies only, but immunization of g.pigs with various types of adenovirus produced sera reacting to about the same titre with both antigens. In gel diffusion precipitation tests, 3 heterologous precipitation lines were

obtained between adenovirus serum and CVH antigen but none between CVH serum and adenovirus antigen.—A. ACKROYD.

Soave, O. A. & Lennette, E. H. (1960). **Infectious canine hepatitis coincidentally associated with vaccination against rabies.**—*Amer. J. publ. Hlth* 50, 1582-1587. 1133

Canine hepatitis virus, isolated in monolayer dog kidney cell culture, was associated with an outbreak of disease, affecting 34 of about 1,200 dogs, after antirabic vaccination with egg-passaged Flury strain. Fourteen dogs died. Hepatitis virus was isolated from their organs but not from rabies vaccine samples of the batches used. Neither was there any evidence that rabies virus was implicated in the outbreak. It was assumed that, among the large number of dogs vaccinated at the centres, a certain proportion had been infected with virus hepatitis. Contamination of vaccines with extraneous micro-organisms was discussed.—E.G.

Konishi, S., Ikegami, T., Takatori, I., Ochi, Y. & Tomeoka, N. (1960). **[Studies on canine virus hepatitis. IV. Incidence of virus and antibodies in stray dogs.]**—*Jap. J. vet. Sci.* 22, 209-213. [In Japanese. Summary in English.] 1134

Canine hepatitis virus was isolated from the blood of 3 out of 97 stray dogs, and the urine of 9 out of 101; 30% had c.f. antibodies, and 45% had neutralizing antibodies.—M.G.G.

Thorne, A. L. C. & MacLeod, A. J. (1960). **The production and properties of Newcastle disease vaccine (Komarov strain) in Nigeria.**—*Brit. vet. J.* 116, 427-435. [Authors' summary.] 1135

Methods of preparation and administration of Komarov strain Newcastle disease vaccine are described.

The immunity conferred is of a high level, lasting more than one year, and the duration of viability is sufficient for its use under local conditions. This vaccine has proved suitable for the control of Newcastle disease in West Africa.

Nilakantan, P. R., Sakkubai, P. R. & Dhanda, M. R. (1960). **Observations on the effect of immunization of fowls with different vaccine strains of Ranikhet (Newcastle) disease virus.**—*Indian vet. J.* 37, 503-508. [Authors' summary modified.] 1136

The vaccine strains used were Mukteswar, Palestine, American 'B1' and British 'F'. Irrespective of route of vaccination (intra-

muscular, intradermal, intranasal, conjunctival or oral) Mukteswar and Palestine strains evoked a high HI antibody response in the vaccinated birds which withstood challenge infection with virulent virus even after a period of 8 months. Protection against challenge infection was set up in 27 hours after vaccination even though HI antibodies were first detected in their sera 5 days after vaccination.

In birds vaccinated with 'B1' or 'F' strain, HI antibody response was of a low order. The birds withstood challenge infection 2 months but not 8 months after vaccination. Protection against challenge infection was set up 5 days after vaccination and HI antibodies were detected in serum 6 days after vaccination.

Gliński, Z. & Szemberowa, M. (1960). Porównanie uodparniania donosowego i dotchawicowego z domięśniowym kur przeciwko pomorowi rzekomemu drobiu. [**Immunization of fowls against Newcastle disease by the intranasal and intratracheal routes, compared with intramuscular vaccination.**] — Med. Wet., Warszawa 16, 588-590. [In Polish.] 1137

The tests were made in 160 birds, 6 weeks old. Best results were obtained with the intranasal route. Three days after vaccination the HI titre was 52·6 in the intranasal group, 11·8 in the intratracheal and 3 in the intramuscular group. Highest titres were recorded in all 3 groups at 42 days, when they were almost the same in the first 2 groups but 3 times lower in the intramuscular one. After intratracheal vaccination the birds were dull for 3-4 days but no adverse effects were noted in the other 2 groups.—M. GITTER.

Zinca, S., Papadopol, M., Ţaga, L., Anghel, V. & Sasu, E. (1960). Concentrarea virusului pseudopestei aviare prin adsorbție pe caolin. [**Concentration of Newcastle disease virus by adsorption on kaolin.**] — Lucr. Inst. Pat. Igienă anim., București 10, 269-275. [In Roumanian. Summaries in French and Russian.] 1138

Tenfold concentration of the virus in allanto-amniotic fluid was achieved by adsorption on aluminium hydroxide at pH 6·0-6·4, followed by elution with one-tenth the volume of normal saline buffered with phosphate to give pH 8·0-8·3.—R.M.

Raggi, L. G. (1960). **A variant type of infectious bronchitis virus in a commercial vaccine.** — Avian Diseases 4, 312-319. 1139

Only 13 of 40 fowls immunized with a vaccine prepared from the Connecticut type of infectious bronchitis virus resisted intratracheal challenge with the Massachusetts type, and 16 of 20 birds immunized with the Massachusetts type resisted challenge with the Connecticut type. But 62 out of 63 birds were immune to challenge with the homologous type. Neutralizing antibodies against infectious bronchitis virus were demonstrated, immediately before challenge, in the serum of 10 of the susceptible birds.—M.G.G.

Bankowski, R. A., Corstvet, R. & Philipppo, W. (1960). **Isolation of an unidentified myxovirus from chickens with a respiratory disease.** — Avian Diseases 4, 304-305. 1140

A filtrable agent isolated from tracheal exudates of chickens during an outbreak of infectious laryngotracheitis with high mortality was cytopathic for HeLa and pig kidney cells, caused sporadic mortality in chick embryos, and mild respiratory distress without mortality in experimental chickens. It was not neutralized by sera against Newcastle disease, infectious bronchitis, fowl plague, influenza A, B, and C, mumps, quail bronchitis, and parainfluenza types 1, 2, and 3. Antibodies to the agent were detected in 3 of 169 flocks of chickens with respiratory illness in California. —M.G.G.

Lissot, M. G. & Sabatier, H. (1960). Constata-tions hématologiques au cours d'études sur les maladies respiratoires des volailles. [**Inclusions in erythrocytes of fowls with chronic respiratory disease.**]—Bull. Acad. vét. Fr. 33, 317-319. Discussion: p. 319. 1141

An outbreak of chronic respiratory disease was controlled with antibiotics. Inclusion bodies were demonstrable in survivors, in subsequently hatched chickens (at the age of 8 weeks) in the r.b.c., spleen, liver and, occasionally bone marrow; in experimental birds kept in contact with the survivors; in 5-10% of heart blood r.b.c. of 10-day embryos inoculated with blood from infected birds. A marked diminution in the number of inclusions was observed in cockerels at the age of 3 months after development of the secondary sexual characters. —T.E.G.R.

Polony, R., Koppel, Z. & Vrtiak, J. (1960). Epizootologické sledovanie ornitózy na východnom Slovensku. [**Psittacosis in Eastern Slovakia.**] — Vet. Čas. 9, 476-483.



[In Slovak. Summaries in English, French, German and Russian.] 1142

Of 314 samples collected during 1958–1960 in Eastern Slovakia, psittacosis virus was isolated from material from 14 fowls, six ducks and one partridge. Incidence and mortality were highest in ducks, particularly during May–July. On one farm nearly 90% of ducks were lost. Transmission to man was proved on three duck farms. Details were given of clinical and P.M. findings.—E.G.

Popovici, V. & May, I. (1960). Cercetări într-un nou focar de ornitoză la rate. [**Fresh outbreak of psittacosis in ducks.**]—Lucr. Inst. Pat. Igienă anim., București 10, 119–125. [In Roumanian. Summaries in French and Russian.] 1143

A previous outbreak in Roumania was diagnosed in 5 flocks in 1958 by Popovici and others [*Lucr. Inst. Pat. Igienă anim.* 9, 103–107.] Another outbreak accompanied by heavy losses occurred in 1959 among 1,250 ducklings, and 4 persons handling the birds became infected. No illness was seen in adult ducks of the flock. Virus isolated was identical with the strains previously isolated from ducks: it was pathogenic for mice and chick embryos but not for g.pigs by i/p and i/m routes nor for pigeons by i/p and intracerebral routes.—R.M.

Officer, J. E. & Brown, A. (1960). **Growth of psittacosis virus in tissue culture.**—J. infect. Dis. 107, 283–299. 1144

Growth and morphological development of two strains of the virus were compared. Special attention was given to the similarities

or differences in the cell-virus interactions as a result of using two strains of psittacosis which differed in their virulence for animal and human hosts, and using two different tissue culture systems as hosts.—R.M.

Page, L. A. & Bankowski, R. A. (1960). **Factors affecting the production and detection of ornithosis antibodies in infected turkeys.**—Amer. J. vet. Res. 21, 971–978. [Authors' summary modified.] 1145

The results of complement-fixation inhibition, direct complement fixation and capillary tube agglutination tests on 330 serums collected at intervals from turkeys experimentally infected with three strains of the psittacosis agent were compared. Percentage agreement of all three tests on serums taken on the 19th, 46th, and 104th days after inoculation were 53·8%, 78·8%, and 40·7% respectively.

For diagnostic purposes, tests for psittacosis antibodies in the serum of turkeys in flocks suspected of being affected should be used only to support clinical, pathological, and microbiological investigations.

Dekking, F. (1961). Chemotherapie van ornithosis. [**Chemotherapy of psittacosis.**]—Tijdschr. Diergeneesk. 86, 62–63. [In Dutch.] 1146

D. commented on van Vloten's report on streptomycin treatment of psittacosis in pigeons [*V.B.* 30, 735]. He cited literature which showed that the virus was not susceptible to the action of streptomycin. The tetracycline antibiotics appeared to be more active than streptomycin.—R.M.

See also absts. 1041 (brucella bacteriophage); 1221 (disease eradication in Canada); 1223 (serapie); 1310 (report, C.S.I.R.O.); 1311 (report, Kenya); 1312 (report, British Guiana); 1314 (report, North Borneo); 1315 (book, biology of microorganisms).

## IMMUNITY

Halliday, R. & Kekwick, R. A. (1960). **The selection of antibodies by the gut of the young rat.**—Proc. roy. Soc. Ser. B. 153, 279–286. [Authors' abst. modified.] 1147

The young of mother rats which had been immunized against *Salmonella pullorum* absorbed relatively much less antibody when they were suckled during the period shortly after the initial immunization than during the period of hyperimmunity. After hyperimmunization against *Brucella abortus* both the maternal serum titres attained and the amounts of antibody reaching the young were similar to those of rats given a single immunizing injection of *S. pullorum*. Anti-

bodies from hyperimmune *S. pullorum* sera produced in rodents and rabbits, and from hyperimmune brucella serum produced in rats, g.pigs and rabbits, when fed to young rats were absorbed in amounts independent of the species in which the sera were produced but related to the antigen.

The gut of the young rat was therefore selecting between antibodies produced in the same animal to the same antigen, the donor differing only in serum titre and length of the immunization period; and between antibodies produced in the same species to different antigens. Fractionation of immune sera produced evidence that this selection of antibodies

is related to their location in the serum proteins.

- (1960). **Fifth international meeting of biological standardization held at the Hebrew University, Jerusalem, September 13-20, 1959.** pp. 496. Jerusalem: The Weizmann Science Press of Israel. 1148

The Proceedings comprises 54 papers written in English, French or (in one case) German. In the section "Standardization of prophylactics in zoonoses and anthroozoonoses caused by viruses" there are papers on titration of specific antisera (Goret, Vacher & Michel: in French); titration of rabies immune serum (Sartorius & Winkler: in German); time of appearance of rabies antigen in the brain of mice (Goldwasser & Kimron); neutralization test in kidney cell cultures for testing foot and mouth disease vaccines (Mackowiak and others: in French). In another section on leptospirosis, there is a long paper by Babudieri on the subject of vaccines (pages 313-350: in English). There are three papers on brucellosis: studies on DNA-associated antigens of *Br. abortus* (Braun, Plescia & Palczuk); immunization of mice with DNA-conjugated proteins (Olitzki, Markenson & Margalith); control methods for vaccines (Gargani). Among the other papers are standardization of *Cl. perfringens* and *Cl. botulinum* sera and vaccines, by Sterne; diagnostic allergens, by Parnas, and lyophilized parasitic antigens (in French), by Coudert.

—R.M.

- Friedman, H. & Gaby, W. I. (1960). **Immunologic unresponsiveness in mice following neonatal exposure to *Shigella* antigens.**—J. Immunol. 85, 478-482. [Authors' summary modified.] 1149

Partial immunological unresponsiveness has been induced in new-born mice by inoculation of a relatively large dose of either cellular or soluble *Shigella paradyseutiae* antigens. Unresponsiveness was temporary and did not last longer than 5 weeks.

Concentration of antigen, route of inoculation and age of the animal at inoculation were important factors; i/p injection within 24 hours of birth with the highest sublethal dose of antigen resulted in the greatest degree of unresponsiveness (tenfold suppression as compared to controls) when challenged at 5 weeks of age. Transfer of immune spleen cells reversed unresponsiveness.

- Moore, N. W. & Rowson, L. E. A. (1961). **Attempts to induce tissue tolerance in sheep.**—Res. vet. Sci. 2, 1-10. [Authors' summary modified.] 1150

One foetus in each of 115 ewes, 50-110 days pregnant, was injected with blood or cellular material from blood and tissues of mature or foetal donors. Many foetuses did not survive injection. A few were aborted, but many more were resorbed. The earlier the stage of pregnancy at which the injections were made, the higher the abortion and resorption rates. Less than 40% of ewes, 50-60 days pregnant at the time of injection, lambed, whereas virtually all which were pregnant for 80 or more days, lambed. One to 2 months after birth the lambs which had been injected in the uterus were tested for tolerance by the exchange of skin homografts with their respective donors. None of the homografts survived for more than 10 days, showing that tolerance had not been established. The possible causes for the abortions and resorptions, and possible reasons for failing to induce tolerance are discussed.

- Hosoda, T., Mogi, K. & Kaneko, T. (1960). **[Serological studies on haemolytic icterus in foals. VII. Changes of blood characters in new-born foals from dams known to have produced icteric foals and fluctuations of type-specific antibodies in their colostrum.]**—Bull. Nat. Inst. agric. Sci., Japan No. 19 pp. 109-115. [In Japanese. Summary in English.] 1151

Foals born to mares whose previous foals had haemolytic icterus were prevented from developing this condition by feeding milk from normal mares. Blood cell counts and specific gravity and viscosity of the blood and blood plasma of the protected foals were normal. Antibody titres in the colostrum were correlated with those in the blood of mares. Foals aged 5 days from normal mares did not develop icterus after drinking colostrum containing antibodies at high titre, but a few had diarrhoea and respiratory distress.—M.G.G.

- Sirbu, Z. & Păunescu, G. (1960). **Cercetări asupra grupelor sanguine și bolii hemolitice la porci. Comunicarea I. [Blood groups and haemolytic disease in pigs.]**—Lucr. Inst. Pat. Igienă anim., București 10, 213-224. [In Roumanian. Summaries in French and Russian.] 1152

In Roumania haemolytic disease was first noticed in 1955 among Mangalitsa pigs. The authors determined blood groups in 636



pigs and also in 19 sows iso-immunized during pregnancy.—R.M.

Parish, W. E., Barrett, A. M. & Coombs, R. R. A. (1960). **Inhalation of cow's milk by sensitized guinea pigs in the conscious and anaesthetized state.**—*Immunology* 3, 307-324. [Authors' summary.] 1153

Introduction of 1 ml. of cow's milk proteins, in the soluble or insoluble form, into the respiratory tract of conscious normal guinea pigs produced negligible clinical effects. In animals sensitized to milk proteins similar treatment produced severe typical anaphylactic reactions and in some animals caused rapid death.

See also absts. 986 (gamma globulin in staphylococcal infections); 990 (haemolysis of *B. anthracis*); 991-996 (TB); 997 & 1001-1002 (John's disease); 1005-1007 (swine erysipelas); 1011 (vaccines against pasteurellosis); 1014 (pseudomonas antiserum); 1018-1019 (*E. coli* infections in pigs); 1021 (immunochemistry of Enterobacteriaceae); 1025 (standardized fowl erythrocytes for polyvalent indirect salmonella agglutination); 1026 (effect of furazolidone on *S. pullorum* and agglutination titres); 1030-1034 & 1038 (brucellosis); 1043-1048 (leptospirosis); 1072-1073 (bovine contagious pleuropneumonia); 1077 (trypanosomiasis); 1084 (coccidiosis); 1087-1092 (toxoplasmosis); 1093-1100 (F. & M. disease); 1102-1104 & 1133 (rabies); 1114-1116 (rinderpest); 1119 (serological relationship between bovine enterovirus and rhinotracheitis virus); 1124 (bovine cutaneous papilloma); 1128 (swine fever); 1130 (distemper); 1131 (measles and distemper); 1132 (adenovirus and canine hepatitis); 1133 (hepatitis in dogs vaccinated against rabies); 1134 (canine virus hepatitis); 1135-1138 (Newcastle disease); 1139 (infectious bronchitis variant in vaccine); 1164, 1170, 1177 & 1184 (helminths); 1194 (distribution of labelled antibody to dog fibrin in tumour-bearing dogs).

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Sharma, R. M., Dyal, R. S. & Chawla, L. R. (1960). **Systemic insecticides in the control of cattle grubs.**—*Vet. Rec.* 72, 898-901. [Authors' summary modified.] 1154

In experimental trials at Hissar, India, using Neguvon, single oral administration in July at 75 mg. per kg. body wt. resulted in 46%; 2 doses in July and August, 75.5%; 3 doses in May, June and July, 75% and 3 doses in August, September and October, a 90% reduction in the number of warble nodules as compared with controls.

Washing the backs of warbled cattle with a 1.5% solution, 3 times at 4-weekly intervals, resulted in an 86%, and a 2% solution a 97.5% decrease in the number of warbles as compared with controls.

Local treatment with 0.5 to 1% Asuntol solution, applied 4 times at 3-weekly intervals, did not prove useful, the average percentage reduction being only 7.4 as compared with controls.

Johnson, W. P. (1960). **The effect of dimethoate on *Dermatobia hominis* in cattle.**—*Amer. J. vet. Res.* 21, 1046-1048. [Author's summary modified.] 1155

Fifty-one infested cattle in Costa Rica and Nicaragua were given dimethoate at several dosages by intramuscular, subcutaneous, or oral routes. At varying intervals after treatment, a representative

In unsensitized guinea pigs, lightly anaesthetized to simulate sleep, similar administration of milk was without significant effect, but the inhalation of cow's milk by lightly anaesthetized sensitized guinea pigs resulted in an arrest of respiration and many of the animals died quietly without any struggle or excitement. The lungs of these animals did not show the acute emphysema characteristic of anaphylactic shock.

The experimental results are presented in support of the hypothesis that 'cot death' in the human infant may be caused by a hypersensitivity reaction consequent on the inhalation of cow's milk proteins regurgitated from the stomach during sleep.

number of larvae was removed from each animal to determine whether they were dead or alive. At 10 mg./kg. body wt., given s/c or i/m, the drug killed 98% and all, respectively, of the larvae examined. Lower doses by these routes and the oral dose of 7.5 ml./kg. gave a less satisfactory kill.

Two of the cattle given 10 mg./kg. intramuscularly developed signs of toxicosis, but neither the incidence nor severity of these signs was serious enough to preclude the general use of dimethoate for dermatobia control.

Stansbury, R. E. & Goodhue, L. D. (1960). **New fly repellents in dairy sprays.**—*Agric. Chemic.* 15, No. 10 pp. 43-44; 141; 143 & 145. 1156

The ability of a mixture of pyrethrins and a pyrethrum synergist in oil to protect grazing cows from *Stomoxys calcitrans* and *Siphona irritans* was enhanced considerably by the addition of 3-chloropropyl *n*-octyl sulphoxide or di-*n*-propyl isocinchomeronate. —M.G.G.

Anon. (1960/61). **I. African tick, carrier of animal diseases, in Florida. II. African ticks found at 2 U.S. locations.**—*J. Amer. vet. med. Ass.* 137, 584 & 138, 12. 1157

The U.S. Department of Agriculture reported the finding of *Rhipicephalus evertsi*

on cattle in Florida in October 1960. This African tick has not been found before in North America. Over a million cattle, horses and mules in 32 counties of Florida are to be inspected for presence of the tick.

Subsequently the tick was found on zoo animals at Tampa, Florida and at Hudson, New York. Both infestations were traced to a recent importation of 14 zebras from Kenya. The zebras had spent 28 days travelling and 30 days in quarantine before arrival at the zoos.—R.M.

See also absts. 1109-1110 (equine encephalitis); 1112 (arthropod-borne viruses); 1310 (report, C.S.I.R.O.); 1312 (report, British Guiana).

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

Lungu, V., Stoican, E., Fromunda, V. & Drăgușin, A. (1960). Tratatamentul fascioloziei ovine cu amestec uleios de tetraclorură de carbon și hexaclorețan prin administrare parenterală. [Treatment of liver fluke in sheep by parenteral injection of a mixture of carbon tetrachloride and hexachloroethane in liquid paraffin.] —Lucr. Inst. Pat. Igienă anim., București 10, 337-344. [In Roumanian. Summaries in French and Russian.] 1159

The authors have inoculated the mixture previously described [*V.B.* 30, 1889] into the inner surface of the thigh of 3,304 sheep in doses of 6-7 ml. for adults and 5 ml. for lambs aged 8-18 months. They claimed that all flukes were killed within 40 hours of administration. Addition to the mixture of a procaine-type local anaesthetic in a concentration of 1% eliminated general toxic reactions and reduced local reactions to injection. Treatment caused no changes in yield or quality of milk from ewes, and there was no abnormal smell or taste in the meat.—R.M.

Sugiura, K. (1960). [Studies on treatment of fascioliasis. I. Clinical and pathological studies: artificial infection of goats. II. Clinical and pathological studies: liver lesions in cattle. III. Treatment of experimental caprine fascioliasis.]—Bull. Nat. Inst. Anim. Hlth, Tokyo No. 39 pp. 131-147; 149-159 & 161-174. [In Japanese. Abst. from English summaries.] 1160

Forty goats infected with 60 or 120 metacercariae were examined clinically (including the blood picture) and then killed at either 10 days, 4-6 weeks, 8-10 weeks or 3-4 months after infection. The blood picture was correlated with liver lesions at the various stages. There are 16 photomicrographs.

Khatin, M. G. & Dyadechko, V. N. (1960). [Chlorpin, a new parasitocidal analogue of Strobane.] —Veterinariya, Moscow No. 10 pp. 65-66. [In Russian.] 1158

This compound had no harmful effect when applied to the skin of calves in up to 10% concentration. It was readily absorbed and retained by hair, and was rapidly excreted from the body. In a conc. of 0.5% it was active against ticks and the sheep ked. There is no information about its use under field conditions.—R.M.

Lesions in liver from 112 infested slaughtered cattle were classified by histological and histochemical features (24 photomicrographs). It was concluded that the fluke affected the host by means of toxins as well as by mechanical damage to tissues.

Artificially-infected goats were treated with hexachloroethane (HX) by mouth, s/c or i/p; or by i/v inj. of a bismuth preparation, naphthoquinone or stibophen. No treatment had any effect on parasites migrating within the liver 40 days after infection. Two months after infection when flukes were gathering in bile ducts, treatment with HX (by mouth or i/p) was effective and other treatments were not. At three months only HX by mouth was effective.—R.M.

Campbell, W. C. (1960). Nature and possible significance of the pigment in fascioloidiasis. —J. Parasit. 46, 769-775. [Author's summary modified.] 1161

The nature and possible significance of the black pigmentation of organs associated with *Fascioloides magna* infestation in cattle, sheep and deer were discussed. The black material filling the branched intestinal crura of *F. magna* consists chiefly of an iron-porphyrin, and it was this compound that was deposited in the host tissues.

Pande, B. P. & Bhatia, B. B. (1960). On *Ogmocotyle indica* (Bhalerao, 1942) Ruiz, 1946 (Trematoda), the notocotylid monostome of Indian ovines, and its pathogenicity. —J. Parasit. 46, 800-802. [Authors' summary modified.] 1162

The pathogenicity which Katiyer [*V.B.* 27, 167] attributed to *Ogmocotyle* (*Cymbiforma*) *indica* in sheep and goats was probably due to mixed infections with nematodes. The trematode itself causes no more than moderate



damage resulting from attachment and feeding by the worm whereby patches of the intestinal mucosa are destroyed.

Sobrero, R. (1960). Animali domestici ospiti naturali di *Schistosoma bovis* in Somalia. [Domestic animals in Somalia as natural hosts of *Schistosoma bovis*.]—Riv. Parassit. 21, 125-130. [Summary in English.] 1163  
*Schistosoma bovis* was present in 134 of 355 cattle, one of 328 camels, in a goat and in a donkey, slaughtered in Somalia. The predilection sites were the mesenteric vessels and the portal system, including liver, pancreas and spleen. *S. bovis* has not been reported in camels before. The low incidence in camels may be explained by the dislike of these animals for soft boggy ground and the possible development of immunity following primary infection. Snail vectors in Somalia were *Bulinus abyssinicus* and *B. forskali*.

—E.G.

Azimov, S. A. (1959). [I. Allergic and serological diagnosis of *Thysaniezia* infestation in sheep. II. Toxicity of antigens extracted from *Dicrocoelium* and *Thysaniezia*.]—Dokl. Akad. Nauk Uzbek. SSR No. 4 pp. 57-58 & No. 10 pp. 61-63. [In Russian.] 1164

Intrapalpebral, intradermal, precipitation and c.f. tests with polysaccharide antigen of the cestode, *Thysaniezia*, were sensitive and specific, revealing 84%–98% of infested sheep.

Polysaccharide antigen of *Dicrocoelium*, administered i/p, was lethal for mice at a dose of 90–150 mg., for g.pigs at a dose of 350–400 mg., and for rabbits at a dose of 700–1,000 mg. Polysaccharide antigen of *Thysaniezia*, given i/p, was lethal for mice at a dose of 95–150 mg., for g.pigs at a dose of 420–500 mg., and for rabbits at a dose of 840–1,000 mg.; lambs died when given 1,025 mg. s/c or 600 mg. i/v.

—M.G.G.

Gönnert, R. & Schraufstatter, E. (1960). Experimentelle Untersuchungen mit N-(2'-Chlor-4'-nitrophenyl)-5-chlorsalicylamid, einem neuen Bandwurmmittel. 1. Mitteilung: Chemotherapeutische Versuche. [Studies on Yomesan, a new drug against tapeworms. I. Chemotherapy experiments.]—Arzneimittelforsch. 10, 881-884. 1165

Hecht, G. & Gloxhuber, C. (1960). Experimentelle Untersuchungen mit N-(2'-Chlor-4'-nitrophenyl)-5-chlorsalicylamid, einem neuen Bandwurmmittel. 2. Mitteilung: Toxicologische Untersuchungen. [Studies on Yomesan, a new drug against tapeworms. II.

Toxicology.]—Arzneimittelforsch. 10, 884-885. 1166

Strufe, R. & Gönnert, R. (1960). Experimentelle Untersuchungen mit N-(2'-Chlor-4'-nitrophenyl)-5-chlorsalicylamid, einem neuen Bandwurmmittel. 3. Mitteilung: Studien über die Verteilung im Intestinaltrakt der Ratte. [Studies on Yomesan, a new drug against tapeworms. III. Distribution in the intestinal tract.]—Arzneimittelforsch. 10, 886-890. [Summaries in English.] 1167

Yomesan is N-(2'-chlor-4'-nitrophenyl)-5-chlorsalicylamide. The oral curative dose for rats was around 50 mg./kg. body wt. *Taenia hydatigena* and *Dipylidium caninum* in dogs were removed by a single dose between 50 mg. and 2 g./kg., and *Moniezia expansa* in an ox, three sheep and a goat were removed by administration of 50 or 250 mg./kg. The drug also appeared to act against *Railletina* in fowls, but not *Davainea*. The drug caused maceration of tapeworms 1–2 hours after administration. High doses (up to 1 g./kg.) or repeated smaller doses by mouth were not very toxic for lab. animals.—R.M.

Burrows, R. B. & Hunt, G. R. (1960). A new dihydrotriazine effective against *Syphacia obvelata* in mice.—J. Parasit. 46, 873-876. [Authors' summary modified.] 1168

Comparative trials were made of the effectiveness of a member of the dihydrotriazine group referred to as BW 58-232, and of piperazine citrate in single doses against *Syphacia obvelata* in mice.

BW 58-232 proved superior in that: it is less toxic; it eliminates both mature and immature stages; it clears a larger percentage of mice; it causes a loss of worms over a longer period of time; and it is effective when mixed with food.

Nardi, E. (1960). Trasmissione sperimentale della trichinosi al suino mediante somministrazione di carne proveniente da volpe parassitata. [Experimental trichinosis in pigs.]—Vet. ital. 11, 537-544. [Summaries in English, French and German.] 1169

Infestation was achieved in one pig fed fox muscle tissue containing 8,000 larvae but not in another pig fed 5,000 larvae; two pigs in contact for over 3 months were not affected.

—T.E.G.R.

Ewert, A. & Olson, L. J. (1960). Immunological tolerance studies with mice and *Trichinella*.—J. Parasit. 46, 849-854. 1170

The authors were unable to induce

immunological tolerance in new-born mice by injection of *Trichinella* antigens by various routes.—R.M.

Field, A. C., Brambell, M. R. & Campbell, J. A. (1960). **Spring rise in faecal worm-egg counts of housed sheep, and its importance in nutritional experiments.**—*Parasitology* 50, 387-399. [Authors' summary modified.] 1171

A spring-rise in faecal strongyloid egg count is described in housed sheep. Large rises were observed in most 3-year-old breeding ewes and primiparous ewe-hoggs, and small rises occurred in some nulliparous ewe-hoggs and wether-hoggs.

A fall in the packed red-cell volume of ewes was seen during the period of spring-rise: no evidence was obtained to attribute the fall to factors other than worm burden.

The fall in packed-cell volume was alleviated by feeding one type of perennial ryegrass, but no direct effect on the worm-egg output was found.

Theories of spring-rise are discussed and the conclusion reached that latent overwintering larvae must play a major part in the phenomenon.

Rogers, W. P. & Sommerville, R. I. (1960). **The physiology of the second ecdysis of parasitic nematodes.**—*Parasitology* 50, 329-348. [Authors' summary modified.] 1172

When third-stage trichostrongyle larvae exsheathed, they released an exsheathing fluid which eroded the sheath at the anterior end. This led to the formation of a refractile ring and ultimately to the fracture of the sheath which enabled the larva to escape.

Exsheathment was induced by ovine rumen fluid. The exsheathing activity of rumen fluid was impaired by centrifuging, filtering, boiling and aeration, but activity could be restored by the addition of reducing agent.

After stimulation, exsheathment continued in the absence of rumen fluid. The ability of rumen fluid to stimulate larvae was dependent upon temperature, pH and oxidation-reduction potential.

Exsheathing fluid was present in larvae both before and after exsheathment. Larvae which had been stimulated to exsheathe released exsheathing fluid for a brief interval and further release could be obtained only after the stimuli had been temporarily withdrawn.

The mechanisms for reception of the stimulus to exsheathe and for storing and

releasing exsheathing fluid were located in a region between the base of the oesophagus and the excretory pore. The fluid was probably released from the excretory pore.

Exsheathing fluid from one species was not necessarily as active against sheaths from other species as against its own. The activity of exsheathing fluid was dependent upon the presence of a heat-stable co-factor of low molecular weight.

Soprunov, F. F. & Tendetnik, Y. Y. (1960). **[The practical use of *Arthrobotrys* fungi for killing helminth larvae.]**—*Trudy gel'mint. Lab.* 10, 192-194. [In Russian.] 1173

Previous experiments showed that *Arthrobotrys oligospora* and *A. dolioformis* were capable of killing larvae of *Ancylostoma duodenale* and of horse strongyles on fields or in manure [*V.B.* 27, 1145]. The present paper briefly describes the preparation and use of fungal cultures.—R.M.

Kenny, J. E. (1960). **A preliminary trial with a new organic phosphate "Ruelene" as an anthelmintic in sheep.**—*Irish vet. J.* 13, 202-208. [Author's summary modified.] 1174

Twenty-nine lambs, reared under very adverse conditions, were used in a preliminary trial with "Ruelene." Though placed on a higher level of nutrition 11 of these lambs died subsequent to their arrival at the Laboratory. The remaining 18 lambs were divided into two equal groups after taking into consideration their weight and egg counts. The lambs in one group were drenched with 'Ruelene' on two occasions, the other group being controls. The dosage rate was 2 g. active ingredient (approx.  $\frac{1}{4}$  ounce of the wettable powder) per 50 lb. of body wt. Up to the time of the second dosing both groups made similar progress but by the end of the trial the treated group showed much greater improvement and a weight of gain of almost double that of the control group.

Dickson, W. M. & Dunlap, J. S. (1960). **The action of phenothiazine on the metabolism of infective nematode larvae.**—*J. Parasit.* 46, 867-872. [Authors' summary modified.] 1175

Embryonation of nematode eggs was prevented by phenothiazine at a concentration of 0.0013 M in the faeces (dry weight). Hatching of embryonated eggs was almost completely inhibited at 0.003 M. Absorption of the drug by larvae was not increased in the presence of bile.

Phenothiazine inhibited the oxygen uptake



of either mixed nematode larvae or *Haemonchus placei* larvae, and also inhibited the production of radioactive  $\text{CO}_2$  when labelled glucose or pyruvate substrates were metabolized by mixed nematode larvae and when labelled  $\alpha$ -ketoglutaric acid was metabolized by *H. placei* larvae.

Dodd, D. C. (1960). **Hyostrongylosis and gastric ulceration in the pig.**—N.Z. vet. J. 8, 100-103. [Author's summary modified.] 1176

The disease caused by *H. rubidus*, is essentially an ulcerative gastritis with anaemia. In young pigs, the clinical signs are unthriftiness, retarded growth rate, and diarrhoea. The most serious effects are in adult breeding sows, and many die suddenly as the result of haemorrhage from one or more deep ulcers in the gastric mucosa. Some deaths follow perforation of the stomach wall and a subsequent peritonitis.

The drug of choice for treatment is carbon disulphide. This should be combined with improvement in nutrition and sanitation.

Mayhew, R. L., Miller, G. C. & Torbert, B. J. (1960). **Studies on bovine gastro-intestinal parasites. XXI. Immunity to *Cooperia punctata* and *Oesophagostomum radiatum*.**—J. Parasit. 46, 859-866. 1177

Of 30 calves inoculated with *Cooperia punctata*, 26 showed no rise in egg counts, or only a short period of increased counts, after re-infection after a varying interval. The first indication of immunity was a rapid fall in egg count, often followed by repeated rise and fall for as many as three times before remaining low or negative. The longer prepatent period found in some animals after re-inoculation (as much as two or three times the normal) was evidence of retardation of larval development.

Eleven animals were inoculated with *Oesophagostomum radiatum* larvae after they had shown evidence of immunity to *Cooperia* with the result that all became infected.—R.M.

Galvin, T. J., Turk, R. D. & Bell, R. R. (1960). **Anthelmintics for ruminants. I. Studies on the toxicity and efficacy of Bayer 21/199 as an anthelmintic.**—Amer. J. vet. Res. 21, 1054-1057. 1178

Galvin, T. J., Bell, R. R. & Turk, R. D. (1960). **Anthelmintics for ruminants. II. Anthelmintic activity and toxicity of Ruelene in sheep.**—Ibid. 1058-1061. [Authors' summaries modified.] 1179

I. The organic phosphorus compound 21/199 was tested for anthelmintic activity

and toxicity in lambs, and for toxicity in calves. The compound was very active against *Haemonchus* spp. and *Cooperia* spp., but less so against other genera at the dosages used (3 to 12.5 mg./kg. body wt.). Gross signs of toxicosis were noticed in one lamb. The calves which were given 12.5 to 50 mg. per kg. developed marked signs of toxicosis. Two deaths occurred at the higher dosage levels. There was no apparent correlation between kidney function tests and signs of toxicosis in either lambs or calves. In lambs (but not in calves), depression in cholinesterase activity in whole blood seemed to be directly related to the dosage level.

II. "Ruelene" was used in 3 trials, involving 30 lambs, to determine its anthelmintic properties and toxic effects. A comparison of the worm counts of control lambs with the post-treatment worm counts of treated lambs shows that at 100 mg. per kg. body wt. too many parasites were left in the gastro-intestinal tract to recommend Ruelene for use in mixed infections. The higher doses may have more activity; but signs of intoxication appeared in lambs given 200 mg./kg. or more of the compound.

Whole blood cholinesterase activity was depressed to a maximum of 50% at the 100 mg./kg. dose and was severely depressed at higher doses.

Bell, R. R., Galvin, T. J. & Turk, R. D. (1960). **Survival on pasture of infective larvae of *Cooperia pectinata* and *Ostertagia ostertagi*.**—Amer. J. vet. Res. 21, 1101-1103. [Authors' summary modified.] 1180

The survival on pasture of infective larvae of *Cooperia pectinata* was determined in seven trials and of *Ostertagia ostertagi* in five trials in Texas.

The maximum length of survival of *C. pectinata* was 138 days and of *O. ostertagi* 144 days. The maximum time required for half the larvae to die was 46 days and 36 days respectively. Temperature, humidity, and rainfall during the period of the trials were recorded.

Burrows, R. B., Clapham, P., Rawes, D. A., Copp, F. C. & Standen, O. D. (1960). **A new anthelmintic for canine hookworm.**—Nature, Lond. 188, 945-946. 1181

The authors report a series of compounds related to bephenium hydroxynaphthoate, one of which, known as 611 C 55, has been tested extensively in larger animals (as its *p*-chlorobenzene sulphonate). Compared with

bephenium, it was marginally more effective against *Ancylostoma caninum* and *Uncinaria stenocephala* infections in the dog, and was only minimally emetic. Experiments suggest it was also more effective against *Toxocara canis* and *Toxascaris leonina* but it was substantially less effective than bephenium against some of the gastro-intestinal trichostrongyles in sheep. As an anti-hookworm for the dog, 611 C 55 combines high efficiency with only mild emetic properties.—E.V.L.

Richter, S. (1960). Posrednik za razvoj *Streptocara pectinifera* (Neumann, 1900), razvojni ciklus i način invazije. [The fresh-water shrimp *Gammarus triacanthus*, an intermediate host of *Streptocara pectinifera*, a parasite of water fowl.]-Vet. Arhiv 30, 86-92. [In Croat. Summaries in English and German.] 1182

About 20% of shrimps (*Gammarus triacanthus*) from the river Odra were infested with larvae of the poultry gizzard worm. Details of experimental infection in ducklings and chicks by feeding infested shrimps are given. Embryonated ova are apparently excreted by infested aquatic birds with the faeces into the water, where they are ingested by the shrimps, which, in turn are eaten by the birds. Young birds were more susceptible than older ones.—E.G.

(1960). Symposium on husk. I. Jarrett, W. F. H., Jennings, F. W., McIntyre, W. I. M., Mulligan, W., Sharp, N. C. C. & Urquhart, G. M. The disease process. II. Walley, J. K. The use of cyanacethydrazide. III. Parker, W. H. & Vallely, T. H. Observations on husk in calves due to *Dictyocaulus viviparus* infestation with special reference to the therapeutic use of diethylcarbazine. IV. Poynter, D., Jones, B. V., Nelson, A. M. R., Peacock, R., Robinson, J., Silverman, P. H. & Terry, R. J. Recent experiences with vaccination.—Vet. Rec. 72, 1066-1067 & 1068; 1068-1072; 1073-1077; 1078-1086. Discussion: pp. 1086-1090. [Authors' summaries modified.] 1183

I. A brief account was given of the lesions and clinical signs associated with *Dictyocaulus viviparus* infection in cattle. The progress of the disease was divided into pre-patent, patent and postpatent phases, according to the stages of the parasite's life cycle. The complications caused by emphysema, heart failure and other pneumonias were also described briefly.

II. W. discussed the requirements and use of an anthelmintic against lungworms. He reviewed the critical evidence of the high anthelmintic activity of cyanacethydrazide against *Dictyocaulus* species, and its use for the treatment of lungworm infestation in cattle. He discussed the use of cyanacethydrazide in the prevention of parasitic bronchitis and presented evidence of the value of regular monthly dosing. The safety of the therapeutic oral and subcutaneous dose levels was confirmed.

III. In several experiments, both with naturally and artificially infested calves, diethylcarbazine was found effective in treating husk. The standard treatment is 3 daily doses of 10 mg. per lb. but in the most recent work a single dose of 20 mg. per lb. proved almost as effective. There was a very wide toxic margin and the drug was safe in therapeutic doses. Attempts to compare diethylcarbazine with cyanacethydrazide were not successful. The difficulties in diagnosing husk, particularly in differentiating from epidemic bronchopneumonia, were pointed out.

IV. Work in g.pigs and calves showed that the larvae of *D. viviparus* could reach the lung 24 hours after infection. Larvae irradiated at 40,000 r also reached the lung but were there suppressed before the development of disease. Migration to the lung also occurred in resistant animals even when infected with irradiated larvae. The lungs and not the mesenteric lymph nodes appeared to be the main site of larval suppression.

Evidence was provided on the safety of the X-irradiated vaccine and the precautions taken to ensure that it does not transmit other diseases. An outline was given of recent field experiences together with some observations on the complement-fixation test using adult worm antigen. It was emphasized that account must be taken of other respiratory diseases in investigating outbreaks of coughing in calves.

Wade, A. E., Fox, L. E. & Swanson, L. E. (1960). Studies on infection and immunity with the cattle lungworm, *Dictyocaulus viviparus* (Bloch). I. Infection in laboratory animals. II. Reinfection immunity in guinea pigs.—Amer. J. vet. Res. 21, 753-757 & 758-760. [Authors' summaries modified.] 1184

I. Of the small lab. animals (goats,



rabbits, hamsters, rats, mice, and g.pigs) exposed to *D. viviparus*, the g.pig appeared to be the most susceptible. Lungworms did not reach maturity in any of these animals. Infections in g.pigs caused changes in the blood picture, and anorexia, loss of weight, and death. Complement-fixing antibody was demonstrable in the serum 30 and 45 days but not at 129 days after infection. The gamma-globulin content of the serum was elevated by the 30th day after infection.

II. A specific antibody, present in g.pigs infected and challenged with *D. viviparus* larvae, was demonstrable by the Schultz-Dale test. C.f. antibody was demonstrable in g.pigs 10 and 15 days after initial inoculation with the larvae. But this was not observed in 8 of 10 re-infected g.pigs. Increased resistance to infection with *D. viviparus* was produced by a prior infection, smaller and fewer worms being found P.M. in the lungs of re-infected animals.

Rubin, R. & Tillotson, A. J. (1960). **Cyanacethydrazide as a chemotherapeutic agent in the control of experimental bovine verminous pneumonia.**—Amer. J. vet. Res. 21, 1040-1045. [Authors' conclusions modified.] 1185

Cyanacethydrazide removed a substantial percentage of adult or nearly adult lungworms (*D. viviparus*) from the lungs of experimentally infected calves. But it was of no benefit when used early in the course of an infection when the lungworms were immature and were causing severe lesions. Symptomatic treatment early in lungworm infection with penicillin, dihydrostreptomycin, and sulphathiazole was of no apparent value in alleviating clinical signs produced by immature lungworms.

Kostyra, J. (1960). **Przebieg i leczenie telazjozy bydła. [Bovine thelaziasis and its treatment.]**—Med. Wet., Warszawa 16, 584-587. [In Polish. Summaries in English, French, German and Russian.] 1186

Conjunctivitis and keratitis caused by *Thelazia rhodesii* were recorded by the author in 82 cows within 5 years (1955-59). Although the condition occurred in all seasons, the greatest intensity was between July and October. There was good clinical response to instillation into the conjunctival sac of a 3% aqueous solution of piperazine adipate followed by 3% solution of boric acid.

—M. GITTER.

Marolt, J., Vukelić, E., Žuković, M. & Zeškov, B. (1960). **Beitrag zur Untersuchung der Widerristschäden (Onchocercosis) bei Pferd und Esel. [Onchocerca and fistulous withers in horses and donkeys.]**—Schweiz. Arch. Tierheilk. 102, 571-582. [Summaries in English, French and Italian.] 1187

Onchocercosis was established at P.M. examination in 686 of 740 horses over 3 years of age, but only in 3 of 48 less than 3 years old, and in 81 donkeys. Lesions were chiefly in the ligamentum nuchae and in the sub-nuchal bursa; the parasite was identified as *O. reticulata*.—E.V.L.

Raethel, H. S. (1960). **Über das Vorkommen von Blutfaden (Filarien) in tiefgeköhltem Kängarufleisch des Lebensmittelhandels. [Dipetalonema websteri in kangaroo meat.]**—Arch. Lebensmittelhyg. 11, 145-146. 1188

The nematodes were found in deep-frozen meat imported into Germany from Australia. They were still alive. In a subsequent communication (page 232 of the same journal) H. Sens stated that the incidence of the nematodes was not as high as given by Raethel, and that the nematodes were not found in kangaroo tails, which are used for making soup.—R.M.

Rothstein, N. & Brown, M. L. (1960). **Vital staining and differentiation of microfilariae.**—Amer. J. vet. Res. 21, 1090-1094. [Authors' summary modified.] 1189

Viable microfilariae of *Dipetalonema* sp. and *Dirofilaria immitis* in the peripheral blood of dogs and of *D. uniformis* in the rabbit were easily detected by the vital staining technique described, using acridine orange as the preferred fluorochrome. Distinctive differences in the movement of the canine types were seen: that of the microfilariae of *D. immitis* was generally undulating and that of the *Dipetalonema* forms erratic. Another consistent difference was in the number of microfilariae observed. In *Dipetalonema* infections, rarely were more than 3 or 4 microfilariae observed per 20 to 40 cu. mm. of blood. As many as 50 to 65, and never less than 3 to 5, microfilariae of *D. immitis* were seen on a slide prepared in the same manner. Further differentiation was accomplished with the closely related dye, Coriphosphine O. Within 10 min., microfilariae of *D. immitis* were stained only at their extremities, while an interval of 30 min. or more was required

before those of *Dipetalonema* stained, not in the extremities but throughout their entire forms. A comparative study of 282 canine

blood samples indicated that the vital staining technique detected more positive samples than the modified Knott method.

See also *absts.* 1223 (trichostrongylosis in sheep); 1310 (report, C.S.I.R.O.); 1311 (report, Kenya).

## SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

Schmitt, J. & Gemmer, H. (1960). Kasuistischer Beitrag zur Karzinose beim Pferd. Plattenepithelkarzinom der Pars oesophagea des Magens unter dem klinischen Bild der Anaemie. [**Squamous-cell carcinoma of the stomach in a horse with anaemia.**]—Dtsch. tierärztl. Wschr. 67, 494-496. [Summary in English.] 1190

The cause of severe anaemia in a horse 9 years old was considered to be a squamous-cell carcinoma of the stomach.—M.G.G.

Swoboda, R. (1960). Beitrag zum primären Lungenkarzinom unter besonderer Berücksichtigung der Zoo- und Wildtiere. [**Primary carcinoma of the lungs in a camel.**]—Zbl. VetMed. 7, 967-983. [Summaries in English, French and Spanish.] 1191

S. discussed literature on lung cancer in domesticated and wild animals and described a case in a male camel (*Camelus bactrianus*) aged about 15 years, kept at Schönbrunn zoo, Vienna.—R.M.

Cuomo, P. (1960). Un caso di fibrosarcoma intrapericardico. [**Fibrosarcoma of the pericardium in cattle.**]—Veterinaria, Milano 9, 309-310. 1192

Fibrosarcoma of the pericardium without metastases, was observed P.M. in two zebu cattle—within the pericardium in one and on the outer surface in the other.—T.E.G.R.

Nielsen, S. W. & Cole, C. R. (1960). **Cutaneous epithelial neoplasms of the dog—a report of 153 cases.**—Amer. J. vet. Res. 21, 931-948. 1193

An account is given of the cutaneous epithelial neoplasms (excluding viral papillomas, mammary and peri-anal gland tumours) found in 153 dogs in the 10 year period commencing 1949 at the Department of Veterinary Pathology, Columbus, Ohio; 7,849 canine skin specimens were examined in that period. The gross and microscopic features of the tumours are described, information is given on age, breed, sex and site incidence, growth rate, recurrence and metastasis, and the literature is reviewed.

The tumours comprised: 14 apocrine sweat gland tumours (6 adenocarcinomas, 5

adenomas, and 3 mixed tumours with chondroid metaplasia); 33 basal-cell tumours, without evidence of differentiation in the direction of hair follicles, sweat or sebaceous glands; 7 trichoepitheliomas, forming a pattern simulating either mature or incompletely-formed hair follicles; 5 calcifying epitheliomas; 31 squamous-cell carcinomas; 9 squamous papillomas (distinct from viral papillomas or fibrous papillomas); 54 sebaceous gland tumours (29 adenomas and 25 carcinomas).

This well-illustrated article should be consulted for details.—E. COTCHIN.

Spar, I. L., Bale, W. F., Goodland, R. L., Casarett, G. W. & Michaelson, S. M. (1960). **Distribution of injected I<sup>131</sup>-labeled antibody to dog fibrin in tumor-bearing dogs.**—Cancer Res. 20, 1501-1504. 1194

Antibody labelled with radio-iodine was inj. i/v into 28 dogs with spontaneous tumours. Most tumours showed no preferential concentration of the isotope, but in a few cases (especially a synovial sarcoma) a large proportion of the injected dose became localized within the tumour. This type of treatment might be useful for selective radiation of malignant neoplasms.—R.M.

Mihich, E. & Nichol, C. A. (1960). **Development of a sub-line of mouse sarcoma-180 capable of growing in pyridoxine-deficient animals.**—Nature, Lond. 188, 379-382. 1195

Mouse sarcoma 180 (S-180) transplanted in Swiss mice does not normally regress, but a high incidence of growth impairment and regression was observed in mice on a pyridoxine-deficient diet. The selection of a subline of S-180 (S-180-B<sub>6</sub>) capable of growing in pyridoxine-deficient animals was achieved over a period of 8 months by repeated transplantation in vitamin B<sub>6</sub>-depleted mice, with a gradual increase in the severity of depletion. Both S-180 and S-180-B<sub>6</sub>, grown in deficient animals, had similar low contents of total vitamin B<sub>6</sub>.

The development of this subline provides experimental material for the study of the possible contributions of metabolic and



immunogenetic factors to altered growth capacity.—E. COTCHIN.

Stamatović, S. (1960). Leukoza goveda. I. Rezultati hematološkog pregleda dva zapata uvezenih crvenih danskih krava. [**Bovine leucosis. I. Examination of the blood in imported Danish Red cattle.**]—Vet. Glasn. 14, 849-853. [In Croat. Summary in German.] 1196

By examination of the white blood picture, a subclinical, non-tumorous form of lymphatic leucosis was diagnosed in 17 of 223 Danish Red cattle, imported into Yugoslavia during 1956 and 1959.—E.G.

Deutsch, K. & Siller, W. G. (1961). **An electron microscopical study of the peripheral nerves in two cases of fowl paralysis (neurolymphomatosis).**—Res. vet. Sci. 2, 19-21. [Authors' summary modified.] 1197

An electron microscopical study of

See also abst. 1124 (bovine cutaneous papillomata).

## NUTRITIONAL AND METABOLIC DISORDERS

Darcel, C. le Q., Niilo, L., Langford, E. V., Connell, R. & Beauregard, M. (1960). **Mortality in White Leghorn females on a farm in southern Alberta.**—Avian Diseases 4, 258-272. 1199

Causes of death were ascertained for a period of 3 years in a poultry farm rearing about 3,000 hens each year. Half the birds were fed a restricted diet for part of the growing period. Of these 10%–20% died each year, compared with 2%–16% of those fed *ad libitum*. Blackhead, chronic respiratory disease, cannibalism and miscellaneous causes of death were more frequent in the birds fed a restricted diet, whereas losses from reproductive disorders were higher in those fed *ad lib*. There was no significant difference in the incidence of leucosis and tumours, from which 1% died; types of tumour, age incidence, and the organs affected were tabulated.—M.G.G.

Tsirel'son, N. B. & Ionov, P. S. (1960). [**Action on rabbits of fodder plants grown under the influence of gibberellin.**]—Veterinariya, Moscow No. 10 pp. 63-64. [In Russian.] 1200

Ten rabbits fed for four months on oats, carrots, cabbage, carrot leaves and beet (all grown under the influence of gibberellin) plus meat and bone meal were compared with ten rabbits given the same foods grown normally.

peripheral nerve tissue affected with fowl paralysis confirmed the results of previous light-microscopical studies, and also revealed lesions of the ultra-fine structure of the nerve. The fibrils in the axon were thickened and more numerous; the lamellae of the myelin sheath mostly fused, and the Schwann cells degenerated. Large bundles of collagen fibres between the nerve fibres contributed greatly to the swelling of the nerve. Virus-like particles were not found.

Bather, R., Niilo, L. & Darcel, C. le Q. (1960). **Avian erythroblastosis. II. Uptake of Fe<sup>59</sup> by 'tumor' cells.**—Canad. J. comp. Med. 24, 326-329. [Authors' summary.] 1198

The circulating pro-erythroblasts (tumour cells) found in avian erythroblastosis actively incorporate iron. The possible mechanisms involved will be discussed further in following communications.

Gibberellin-treated plants appeared to increase growth rate. Average increase in body wt. during the experimental period was 1,262 g. compared with 887 g. in the controls.—R.M.

Rowell, H. C., Downie, H. G. & Mustard, J. F. (1960). **Comparison of the effect of egg yolk or butter on the development of atherosclerosis in swine.**—Canad. med. Ass. J. 83, 1175-1186. 1201

In pigs fed for a year on a diet in which one-third of the calories were represented by egg yolk, aortic atherosclerosis occurred six times as frequently as in the normally-fed controls, while in pigs fed a similar proportion of butter it occurred three times as frequently. Involvement of coronary arteries was commoner in pigs fed egg yolk than in those fed butter, and the pigs fed egg yolk developed much higher blood concentrations of cholesterol than the other groups.—R.M.

Elam, C. J., Gutierrez, J. & Davis, R. E. (1960). **Increased feedlot bloat from feeding soybean oil in a mixed ration to steers.**—J. Anim. Sci. 19, 1089-1097. [Authors' summary modified.] 1202

Feeding soya bean oil resulted in a highly significant increase in feedlot bloat, and more cases occurred in steers fed twice-a-day than in those allowed to eat *ad libitum*. Out of several rumen traits studied only the stable ingesta volume was increased significantly by

feeding soya bean oil. None of the rumen volatile fatty acids was highly correlated with bloat. Observations on rumen micro-organisms suggested a relationship between the presence of certain rumen bacteria and feedlot bloat.

Dodd, D. C. & Newling, P. E. (1960). **Muscle degeneration and liver necrosis in the pig: report of a natural outbreak.**—*N.Z. vet. J.* 8, 95-98. 1203

An outbreak of acute dietetic hepatitis with severe degenerative lesions of skeletal and cardiac muscle occurred in a group of 200 pigs, 40 of which had clinical signs of muscle damage. The diet was cheese whey with barley and meat meal, supplemented with minerals and fish-liver oil emulsion (8 oz. emulsion to 500 gal. whey). Several pigs aged 3-4 months died, but some affected pigs recovered and no further cases occurred, after the oil was withdrawn from the diet. The P.M. findings and the histology of the lesions in a severely affected pig were described. Fish-liver oil emulsions should not be added to pig food as sources of vitamins A and D<sub>3</sub>. —F.E.W.

Chalmers, M. I. & Ogilvie, J. M. (1960). **The effect of glucose introduced into the abomasum and rumen on the utilization of casein administered orally to sheep.**—*Proc. Nutr. Soc.* 19, No. 2. pp. xviii-xix of Abstracts. 1204

Ewes receiving a basal diet which gave a zero N balance were given a daily supplement of 50 g. casein by mouth. The marginal apparent retention of nitrogen from the casein was 24%. The administration of 50 g. glucose/day by ruminal fistula increased the percentage N retained from the casein, whereas the administration of the glucose by abomasal fistula had no protein-sparing effect. When the casein and glucose were administered together by abomasal fistula the casein N retention was 62%.—E. J. CASTLE.

Newberne, P. M., Savage, J. E. & O'Dell, B. L. (1960). **Pathology of arginine deficiency in the chick.**—*J. Nutr.* 72, 347-352. [Authors' summary.] 1205

The ataxia and muscle paralysis commonly observed in the arginine-deficient chick were not related directly to low content of muscle creatine. Deficient chicks showed extensive motor neurone damage in the spinal cord, demyelination of peripheral nerves and atrophy of leg muscles. Abnormal bone

development with a degenerate bony matrix was associated with the grossly abnormal tibia which was twisted from its normal axis. Nerve damage appeared to be sufficiently severe to explain the stilted gait of arginine-deficient chicks and the abnormal bone development accounts for the peculiar stance. Damage to the epithelium of the feather follicle probably accounts for the incomplete development of feathers.

van Koetsveld, E. E. & Boogaardt, J. (1960). **Bloedkoperonderzoek bij klinisch gezonde melk-koeien. [Copper estimations in blood of clinically healthy dairy cows.]**—*Tijdschr. Diergeneesk.* 85, 1689-1704. [In Dutch. Summaries in English, French and German.] 1206

Single blood samples were taken from 100 cows on 17 farms. Samples were also taken at monthly intervals from 18 cows and at daily or weekly intervals from another 13. The breed was not named, but was probably Friesian. Mean copper content was  $76.8 \pm 12.2$   $\mu\text{g./100 ml.}$  in whole blood,  $89.1 \pm 18.2$  in plasma and  $54.2 \pm 20.2$  in erythrocytes. Values below 60 were regarded as deficient. The fluctuations in plasma Cu at monthly, weekly and daily intervals amounted to 50, 40 and 12% respectively while fluctuations in erythrocyte Cu were 100, 100 and 60%. Plasma Cu increased when cattle were moved from pasture into their winter quarters. Pregnancy had no influence on plasma Cu, but values were high after calving. Some healthy cows had low content of Cu in plasma but high content in erythrocytes. The feeding of Cu supplements towards the end of winter housing was advised, in order to allow for the low Cu content of spring grass.—R.M.

Wallace, H. D., McCall, J. T., Bass, B. & Combs, G. E. (1960). **High level copper for growing-finishing swine.**—*J. Anim. Sci.* 19, 1153-1163. [Authors' summary modified.] 1207

In six feeding experiments with 230 newly weaned pigs the authors studied (1) the influence of high levels of copper as copper sulphate on growth; (2) possible interrelationships of high levels of copper and zinc fed in combination; and (3) the influence of dietary protein level on copper toxicosis.

Cu at 250 p.p.m. and above was toxic; 200 p.p.m. did not depress growth, performance but did reduce haemoglobin levels; at 150 and 100 p.p.m. it was generally non-toxic. Marked and consistent growth responses and feed savings were not obtained at any level



of copper supplementation. An overall evaluation of the results of these experiments would not justify the use of high level copper supplementation for pigs fed maize/soya bean meal rations of the type fed in these experiments.

High levels of zinc (500 and 1,000 p.p.m.) fed alone and in combination with high levels of copper did not influence growth. Evidence suggested that copper may have been effective in the prevention of parakeratosis. Otherwise there was no evidence of a copper-zinc interrelationship.

Protein level significantly influenced the toxic effects of copper. When 750 p.p.m. Cu was fed with three levels of protein (15, 20 and 25%) the toxic effects as measured by gain, feed conversion and haemoglobin levels became less as the protein level increased.

Westerlund, A. (1960). **The metabolic behaviour of magnesium in lactating cows.** — K. LandtbrHögsk. Ann. 26, 217-227. [Author's summary modified.] 1208

Four factors more or less closely inter-dependent are the content of magnesium in food, urine and faeces, and the water content of faeces.

The amount of Mg in milk decreases when the amount in urine increases, and increases when the ingestion of Mg increases.

The content of Mg in urine increases when food Mg and faecal water increase, but is reduced when faecal Mg and milk Mg increase.

The content of Mg in faeces increases when food Mg and faecal water increase, but decreases when urinary magnesium increases.

Downey, N. E. (1960). **Prolonged feeding of calcined magnesite.** — Vet. Rec. 72, 1023-1024. 1209

Signs of rickets appeared in some of a group of yearling calves which had been housed for 2 months and fed hay, silage and crushed oats plus  $\frac{1}{3}$ – $\frac{2}{3}$  oz. cod-liver oil and  $\frac{1}{2}$  oz. calcined magnesite per day. Two calves died and two were destroyed and the chief P.M. lesions were bone fractures and exostoses on the ribs. Serum calcium and blood inorganic phosphorus levels were abnormally low in calves showing signs of stiffness. Withdrawal of the cod-liver oil and calcined magnesite and their replacement by bone meal halted the progress of the disease. It is recommended that calcined magnesite should only be fed when strictly necessary.—E. J. CASTLE.

Denton, D. A. & Sabine, J. R. (1960). **The selective appetite for Na in sheep.** — J. Physiol. 154, No. 1 p. 51P of Proceedings. 1210

Sheep with a permanent parotid fistula were offered solutions of sodium salts of different concentrations for varying periods. They consistently drank enough to compensate for the loss through the fistula. NaHCO<sub>3</sub> was preferred to NaCl. KCl solution was accepted rarely.—M.G.G.

Maag, D. D., Orsborn, J. S. & Clopton, J. R. (1960). **The effect of sodium selenite on cattle.**—Amer. J. vet. Res. 21, 1049-1053. [Authors' summary modified.] 1211

Eight steers were fed a ration of ground grain, lucerne hay, and molasses plus (three times a week) sodium selenite from 0.25 to 0.5 mg. per lb. body wt. The other 5 steers were fed the same ration without selenium. Two of the steers died within eight weeks. Four more died after 20 to 23 weeks. Cumulative effects from sodium selenite were not demonstrated. It was shown that there is a level of dosage of sodium selenite which an animal can tolerate without visible ill effects. Acute sodium selenite toxicosis was manifested by severe gastro-intestinal irritation, inappetence, and depression, leading finally to incoordination, coma, and death. In 2 of the steers, histological lesions of polioencephalomalacia were present.

Anon. (1960). **Iodine deficiency in domestic animals. Symptoms, diagnosis, control.** — Iodine Inform. No. 55. pp. 27. 1212

A review of the literature.—R.M.

— (1960). **Symposium on disorders of calcium metabolism.**

I. Littlejohn, A. I. & Lewis, G. **Experimental studies of the relationship between the calcium-phosphorus ratio of the diet and fertility in heifers: a preliminary report.**

II. Moodie, E. W. **Some aspects of hypocalcaemia in cattle.**

III. Greig, W. A. **Calcium-iron relationships in fattening pigs.**

IV. Campbell, J. R. **Calcium and phosphorus imbalance in growing dogs.**—Vet. Rec. 72, 1137-1144; 1145-1149; 1149-1152 & 1153; 1153-1157. Discussion: pp. 1157-1161. [Authors' summaries.] 1213

I. Large-scale controlled experiments at Weybridge in 1958 and 1959 failed to demonstrate any significant relationship between the Ca : P ratio of the diet and fertility in dairy

heifers, whether the level of herd fertility was high or low. The occurrence of "silent" but fertile heats in some young heifers is recorded. A high Ca:P ratio depressed growth rate. There was no relationship between the level of liver copper and either fertility or the intensity of oestrus. A high intake of phosphorus depressed serum calcium even where the intake of calcium was also high.

II. The literature relating to the exchange of calcium between the blood and tissues of lactating cattle is briefly reviewed and the importance of an uninterrupted absorption of calcium from the alimentary canal is stressed. The mode of action of various methods of preventing milk fever is considered.

III. Calcium carbonate fed in large amount to pregnant and lactating gilts had no effect on their blood haemoglobin concentrations, nor did it affect either the blood haemoglobin concentrations or the initial growth rates of their offspring.

Supplements of calcium carbonate fed to fattening pigs from weaning onwards can cause iron deficiency, shown by reductions in blood haemoglobin concentrations and rates of live-weight gain. This effect is especially marked in litters with low weaning weights, probably because their reserves of iron are generally lower. Iron injected at weaning will overcome these deleterious effects. Even if calcium carbonate is not fed, injections of iron at weaning may prove beneficial.

IV. Puppies fed on diets deficient in calcium or phosphorus or both showed radiological and histological changes in the bones, and changes in the blood mineral levels. Different diets produced different effects, the calcium-deficient diet producing changes which were distinct from those produced by the phosphorus-deficient diet. These differences are described, as well as the effects of various treatments. A brief review of the literature is included.

Moore, T. & Sharman, I. M. (1960). **Calcium deficiency in rats fed upon meat.**—*Brit. med. J.* December 10th, 1704-1707. 1214

Rats fed an all meat diet containing fat and vitamin A stopped gaining weight after about 30 days and generally died within 80 days. Their bones became soft and had a reduced opacity to X-rays and deformities and fractures were common, and haemorrhages sometimes occurred, particularly intramuscularly. The inclusion of 200 i.u. vitamin

D weekly in the diet had little beneficial effect but the inclusion of calcium either with or without vitamin D prevented both the failure in growth and skeletal abnormalities. Rats fed a diet of lean meat without added fat reached higher body weights than those receiving fat, skeletal abnormalities were less severe and the incidence of deaths lower.

—E. J. CASTLE.

Fiennes, R. N. T.-W. & Graham-Jones, O. (1960). **Studies of a nutritional disease (osteodystrophia fibrosa) of young lions associated with changes of the skeleton and symptoms of muscular weakness.**—*Proc. zool. Soc., Lond.* 133, 573-591. 1215

The authors investigated a disease which, during the past seven years, has affected 8 of 32 lions in the London Zoo. The primary lesion was considered to be osteodystrophia fibrosa, but histological findings were not given. It appeared to be associated with the low ratio of Ca and P (1:20) of the red-meat diet. Lions do not eat sufficient bone to correct this ratio. Supplements of calcium gluconate in drinking water and calcium carbonate in meat led to the recovery of one severely-affected lioness.—R.M.

Usui, K., Fujita, T. & Inoue, K. (1960). **Studies on vitamin A deficiency in domestic animals. I. Storage of vitamin A in the liver of dairy cattle in Japan, with special reference to its seasonal fluctuation.**—*Jap. J. vet. Sci.* 22, 159-166. [In English. Summary in Japanese.] 1216

The vitamin A content of the liver of 182 slaughtered cows, determined at intervals over a 13 month period, was highest in December and lowest in April. Proliferation of connective tissue and fatty degeneration in the liver was associated with low levels of vitamin A. There were no statistical differences between the vitamin A content of the different lobes of the liver and there was no correlation between vitamin A concentration in the liver and that in the plasma or mammary gland or with the liver glycogen content.—E. J. CASTLE.

McTaggart, H. S. (1960). **Depression of serum Mg levels in ruminants by vitamin D.**—*Vet. Rec.* 72, 1135. 1217

Injection of 400,000 i.u. vitamin D3 into 8 age-matched Scottish black-faced ewes grazing the north side of a hill produced no obvious change in serum magnesium levels. When given to a similar group grazing the south side of the hill the mean serum Mg



level dropped to about  $\frac{1}{3}$  that of controls 2 or 3 months after injection. In another experiment, on a partly shaded hill, the mean serum Mg level of treated sheep was reduced to  $\frac{1}{3}$  that of controls, when the vitamin D was given in January, but not when given in March. When considering vitamin D excess the animal's natural stores must be taken into account as well as the amount of vitamin administered.—E. J. CASTLE.

Lannek, N., Lindberg, P., Nilsson, G., Nordström, G. & Orstadius, K. (1961). **Production of vitamin-E deficiency and muscular dystrophy in pigs.**—Res. vet. Sci. 2, 67-72. [Authors' summary.] 1218

A vitamin E-deficient diet with 'stripped' lard as the source of fat did not cause muscular dystrophy in pigs. When cod-liver oil replaced the lard, muscular dystrophy resulted, although the oil was rich in  $\alpha$ -tocopherol. Further addition of  $\alpha$ -tocopherol prevented the disease. Injection of sodium selenite solution had a curative effect. The results are discussed in relation to the spontaneous disease.

Polukhin, F. S. (1960). [**Ketone bodies in the blood of dairy cows with the alimentary**

**toxaemia type of metabolic disturbance.**]—Veterinariya, Moscow No. 10 pp. 51-53. [In Russian.] 1219

This paper provides evidence that what the Russians refer to as "the alimentary toxaemia type of metabolic disturbance" or "metabolic disturbance of high-yielding cows" is ketosis. Estimates of acetone, acetoacetic acid and beta-hydroxybutyric acid gave averages of 1.2, 1.5 and 7.0 mg./100 ml. respectively in 22 healthy cows, 2.9, 2.6 and 12.3 in six cows with "subclinical signs of metabolic disturbance", and 11.7, 6.7 and 92.3 in eight clinical cases.—R.M.

Leger, P. (1960). L'acétose de la vache laitière en pays de Caux. Essais de traitement par l'acétyl-méthionine. [**Bovine ketosis and its treatment with acetylmethionine.**] — Thesis, Paris (Alfort) pp. 92. 1220

In 4 years about 400 cattle with ketosis were treated with 20% acetylmethionine, most of them successfully. The dose was 50-100 ml. i/v, repeated in cases slow to recover. Recovery was assisted by simultaneous treatment with standard therapeutics: cortisone, phosphorus, calcium, and magnesium.—M.G.G.

See also absts. 1310 (report, C.S.I.R.O.); 1316 (book, diet in relation to reproduction and viability of the young in pigs); 1317 (book, metabolism of sulphur compounds).

## DISEASES, GENERAL

Moynihan, W. A. (1960). **Recent progress in disease eradication in Canada.**—Canad. vet. J. 1, 384-388. 1221

**TUBERCULOSIS:** 95% of cattle have been tested and 0.14% were infected. **BRUCELLOSIS:** 65% of calves were vaccinated during 1959/60. An average of 1.06% of all cattle were infected. **JOHNE'S DISEASE:** under a Tested Herd scheme, reactors to johnin and c.f. tests were slaughtered and compensation was paid. Among 2,823 cattle in 25 herds, 169 reactors were slaughtered during the past year. **SCRAPIE:** from August 1959 affected flocks and any animal moved from these flocks together with their offspring were slaughtered: since that date 3,242 sheep have been slaughtered. **RABIES:** the incidence in animals was falling. In Ontario compensation was paid to owners for farm animals that died of rabies.—R.M.

Ritchie, J. (1960). **Measures for the quick detection of a contagious disease in a country**

**where it has not yet been recognised. (The administrative aspect.)**—Bull. Off. int. Epiz. 54, May pp. 105-114. [In English. Summaries in French and Spanish.] 1222

Prevention of the introduction of exotic diseases is based primarily on strict control of the importation of animals and animal products and an accurate knowledge of the animal health situation in foreign countries is essential. Early diagnosis and notification (by state veterinarians and private practitioners) of any unusual disease is of great importance. Exotic disease should be borne in mind whenever a definite diagnosis cannot be made. Provisions for such an eventuality are discussed and attention is drawn to the care to be exercised for the prevention of spread of infection in the course of diagnostic procedures. It is recommended that veterinary services should keep lists of veterinarians in their country who are familiar with exotic diseases.—T.E.G.R.

## (1960). Symposium on diseases of sheep.

I. Montgomerie, R. F. The prevention of pulpy kidney disease.

II. Watt, J. A. A. Sudden death in sheep.

III. MacKay, J. M. K., Smith, W. & Stamp, J. T. Experimental scrapie: some recent work.

IV. Campbell, J. A. & Gardiner, A. C. Anaemia in trichostrongylid infestations. — Vet. Rec. 72, 995-1011. Discussion: pp. 1011-1014. [Authors' summaries modified.] 1223

I. Pulpy kidney disease cannot be regarded as an infectious or contagious disease in the ordinarily accepted use of these terms. It is a toxæmia arising from the absorption of the toxin of *Clostridium welchii* type D, produced in the gut when the intestinal contents are of a nature conducive to rapid growth of the organism.

A large and high quality food intake appears to be the main factor which creates the favourable intestinal conditions, but this is the basis of modern intensive methods of sheep management. Very often the management conditions accepted as essential to economic production of lamb and mutton are those which lead to a high incidence of pulpy kidney disease.

Methods of management which may be of value in the prevention of this disease are essentially those which check thriving and, therefore, defeat the objective of the flock-master. In these circumstances it is suggested that the role of the veterinary surgeon is to meet the risk created by the desirable environment by establishing and maintaining a high level of immunity in all the sheep all the time.

Specific antiserum is recognized as the method of establishing a short-term immediate protection in the face of losses from the disease, but continuous protection must be the objective, and suggestions are made for the use of vaccine to this end.

II. The importance of flock history, management, season of the year and relation to parturition in the diagnosis of the cause of sudden death in sheep is discussed. The conditions commonly associated with sudden death are listed according to their seasonal occurrence and the age of animal affected. Diagnosis of the individual diseases under field conditions is considered with a description of the post-mortem lesions and confirmatory tests.

W. discussed the relative economic importance of the diseases leading to sudden

death. The incidence of the various causes as encountered by a diagnostic laboratory in south-east Scotland was tabulated.

III. In recent experiments using sheep-passaged and goat-passaged sources of scrapie with Cheviot sheep as test animals, the effect of boiling the inoculum was further investigated. The material was active when administered subcutaneously. Dilution and serial transmission experiments are described. No cases of scrapie occurred in animals injected with autoclaved material.

An attempt to demonstrate activity in brains of young sheep is described.

The addition of adjuvants to scrapie sheep spleen and lymph nodes prior to injection did not appear to influence the process.

The above findings are discussed.

IV. The anaemias associated with trichostrongylid infestations are reviewed and the nature of the pathogenic mechanisms discussed. The evidence is confined mainly to *Haemonchus contortus* and *Trichostrongylus axei*. It is suggested that gastric haemorrhage and dyshaemopoiesis of alimentary origin may both play a part but while the latter is characteristic of *T. axei* infestations, the anaemia of haemonchosis is predominantly of the former type. The evidence is examined which relates infestation size and blood damage quantitatively. Close correlations are described between helminth reproductive activity and the degree of red-cell reduction in the post-haemorrhagic anaemia of haemonchosis, but the quantitative aspects of the other types of anaemia remain to be worked out. It is concluded that in haemonchosis the reproducing adults play a relatively much greater part in the genesis of anaemia than do the developing larvae.

Gylstorff, I. (1960). Todesursachenstatistik des Geflügelgesundheitsdienstes Bayern 1948/49 bis 1958/59. [Causes of death in poultry in Bavaria during 1948-1959.] — Mh. VetMed. 15, 627-632. 1224

Tables give the disease incidence in adult fowls, chicks, geese, ducks, turkeys and pigeons sent for examination in Bavaria from 1948 to 1959. The proportion of deaths from fowl paralysis and leucosis, coccidiosis in fowls and salmonella infections in pigeons increased, while that from pullorum disease, pox diseases, *Escherichia coli* infection and TB. decreased.—M.G.G.



Groulade, P., Sorel, P. & Groulade, J. (1960). Ostéo-arthropathie chez le taureau. Etude clinique et biologique. [**Osteoarthropathy in Normandy bulls.**]—Bull. Acad. vét. Fr. 33, 253-272. Discussion: pp. 272-274. 1225

An account is given of osteo-arthritis of the hock joint (rarely of the stifle or other joints) in Normandy bulls at an artificial insemination centre. The clinical, radiological and biological manifestations, gross and microscopic lesions (in the joints, kidneys, liver, spleen and adrenals), treatment, aetiology and control are discussed. Clinically there are: an initial and a static phase. The former is characterized by diminished appetite, slight fever and acute pain and lameness; the latter, by diminished articular movement, ankylosis, leading to obliteration of the angle of the hock, and muscle atrophy. The disease is ascribed to degenerative rheumatism or arthrosis, due to early senescence and diminished function of the adrenals, aggravated by heavy work, repeated heavy pressure on maladjusted articular surfaces. Unbalanced diet, to which the liver and kidney lesions are ascribed, and faulty conformation are contributory causes. Microelectrophoresis (proteins, sugars and lipids) was useful in identifying animals with a predisposition to the disease. Haematological and biochemical studies on bulls at insemination centres are considered fruitful sources of useful information.—T.E.G.R.

Bourdier, P. (1960). Une forme estivale de coryza pseudomembraneux des bovins. [**A summer form of pseudomembranous coryza in cattle.**]—Thesis, Paris (Alfort) pp. 62. 1226

This condition has been recognized for a long time in a defined area of west-central France. Onset is sudden and often violent. There is nasal discharge and severe dyspnoea. False membranes are formed within the nasal passages: ejection of membranes from the nose is accompanied by bleeding. Some acute cases develop pulmonary oedema. It is not often fatal. R. described 15 cases and suggested that the condition was an allergy.—R.M.

Prat, J. (1960). Contribution à l'étude du syndrome "myopathie-dyspnée" des veaux de lait. [**The myopathy-dyspnoea syndrome in unweaned calves.**]—Rev. Méd. vét. 111, 351-367; 440-455; 510-518; 699-708. 1227

This syndrome has been recognized in France for many years. Affected calves, aged

2-3 months, are apparently normal when lying, but if they are made to stand, muscular tremor and dyspnoea become manifest. The dyspnoea is due to pulmonary oedema, not bronchopneumonia. Some calves die suddenly. P.M. examination reveals inflammation and degeneration of muscle, either generalized or localized to heart muscle. It is possible that there are two distinct syndromes: a myocarditis accompanied by dyspnoea and generalized muscle lesions accompanied by tremor. Prat gave details of 20 cases.—R.M.

Ivanov, V. P. & Blazhevich, G. M. (1960). [**Histological changes in the parenchymatous organs of pigs with atrophic rhinitis.**]—Veterinariya, Moscow No. 10 pp. 42-43. [In Russian.] 1228

Complete P.M. examinations were done on 56 slaughtered cases. Apart from nasal and facial lesions there was evidence of localized atrophy and degeneration of certain tissues in parenchymatous organs, accompanied by round-cell infiltration and proliferation of connective tissue. Such changes were common in spleen but they also occurred in liver and kidneys. In 80% of cases the lungs were hyperaemic and the alveoli filled with exudate and cells, mainly alveolar epithelium but also lymphocytes, erythrocytes and polymorphs. In every case there were peribronchial and perivascular areas of focal or diffuse round-cell infiltration often with haemosiderin in many of the nuclei. The histological changes were typical of desquamative catarrhal pneumonia. The authors suggested that these widespread lesions were responsible for retarded growth. [There are four plates of drawings of lesions between pages 32 and 33 of the journal.]—R.M.

Koštanský, K & Trunkát, J. (1960). Příspěvek k specifické prevenci a terapii fibrinózního zánětu kloubů a serózní selat. [**Prevention and treatment of fibrinous arthritis and serositis in piglets.**]—Veterinářství 10, 15-20. [In Czech.] 1229

Stress and chilling due to transportation appeared to be one of the predisposing factors in fibrinous arthritis and serositis of piglets. Nervous symptoms included tremor, nystagmus, mild ataxia and paresis. *Haemophilus suis* was nearly always present in exudate of synovial cavities, cerebrospinal fluid and brain material of affected piglets. Other authors had, however, isolated a PPLO [V.B. 26, 411]. S/c doses of 15 ml. of serum from horses and cattle immunized with *H. suis*,

isolated from affected piglets, were used for the protection of four consignments totalling 470 piglets, 7-12 weeks old, weighing around 17 kg. Doses of 20-30 ml. of serum, given intraperitoneally, enhanced the curative effect of procaine penicillin or streptomycin, but like antibiotics, serum was ineffective after nervous symptoms had become manifest. Differential diagnosis from Teschen disease was discussed.—E.G.

Miller, R. M. (1960). **Feline bronchial asthma.**—Mod. vet. Pract. 41, No. 16 pp. 58-59. 1230

Asthma in three cats responded quickly to i/m inj. of 3 mg. triamcinolone acetate. Differential diagnosis was discussed.—R.M.

Urist, M. R. (1960). **Cage layer osteoporosis.**—Endocrinology 67, 879-880. [Author's abst. modified.] 1231

Newer knowledge of the Cage Layer Fatigue in White Leghorn hens indicates that genetic rather than nutritional or endocrine factors are responsible. The pathological findings in the skeleton indicate that a better name would be Cage Layer Osteoporosis. [See also *V.B.* 30, 2668, 3366 & 3367.]

Rigdon, R. H., Ferguson, T. M. & Couch, J. R. (1960). **Pendulous crops in turkeys—an anatomic and pathologic study.**—Amer. J. vet. Res. 21, 979-986. [Authors' summary modified.] 1232

The muscle in the anterior cervical region that supports the crop of the turkey is a thin, striated muscle attached to the anterior crest of the sternum. It is inserted into the skin on the anterior surface of the neck and into a tendinous attachment that passes superficially to the longus colli group of muscles and is attached on the lateral side of the neck.

No gross anatomical differences were present in muscles of normal birds and those with pendulous crop. Histologically, degenerative changes were present in the muscles of the wall of the pendulous crop, and similar changes were found in muscles elsewhere in the body.

Like degenerative changes were present in the muscles of turkeys that clinically had normal crops but were kept under the same experimental conditions as birds that developed pendulous crop. This suggests that the occurrence of enlarged crop indicates the degree and anatomical site of muscular degeneration.

The findings were suggestive of an

infection and attempts were being made to isolate the agent or agents; a vitamin deficiency was also being considered.

Itikawa, O. (1960). Untersuchungen über die Atombombenschäden bei Pferden in Hiroshima. II. Histopathologische Veränderungen. [Radiation injury in horses of Hiroshima. II. Histopathology of lesions.]—Dtsch. tierärztl. Wschr. 67, 351-356. [Summary in English.] 1233

A description of the histopathology of degenerative, exudative and neoplastic lesions resulting from radiation damage to eyes, skin, scar tissue, lymph nodes, bone marrow, the digestive system, lungs, liver, kidneys, adrenal glands, brain, thyroid gland and tonsils, in two horses which survived the bombing of Hiroshima. The clinical picture and gross lesions were described in a previous paper [*V.B.* 31, 520].—E.G.

I. Marsden, E. (1960). **Radioactivity of soils, plants and bones.**—Nature, Lond. 187, 192-195. 1234

II. Mayneord, W. V., Turner, R. C. & Radley, J. M. (1960). **Alpha activity of certain botanical materials.**—Ibid. 208-211. 1235

III. Hill, C. R. (1960). **Lead-210 and polonium-210 in grass.**—Ibid. 211-212. 1236

I. This paper contains observations and discussion on the distribution of naturally occurring alpha emitting isotopes in soil, plants, and bones. In particular it deals with situations which might be expected to produce radiation hazards to man. High alpha activity in grass from certain areas is attributed to polonium-210. A note on the detection of actinium-A in the presence of other alpha emitters is included. Much of the paper is devoted to circumstances on Niue Island (South Pacific), where exceptionally high environmental levels of alpha activity are found.

II. Naturally occurring alpha emitting isotopes contribute largely to the radiation dose absorbed by the body; details of the alpha activity of food and water, and the subsequent metabolic excursions of this activity are important, as they will be determinants in the extent and variation of this hazard. This paper continues a series aimed at defining these features in man and his environment. It is also important since the early detection of a release of alpha emitters from nuclear installations will be facilitated by this knowledge. Much of the paper dwells upon the distribution of the members of the two naturally



occurring radioactive series originating from uranium-238 and thorium-232. These isotopes may become separated from each other by natural processes: some vegetation samples prepared for counting showed an increase in activity ascribable to the growth into the samples of daughter isotopes.

Such factors as plant preference for certain isotopes, and uncertainty of the degree of radioactive equilibrium existing in the plant-matt-soil system at any particular time, further complicate the situation.

III. Recent observations have shown that the alpha activity in certain samples of grass is largely due to polonium-210, the daughter of the beta emitting lead-210. Evidence suggests that most of this activity arises from foliar deposition of the decay products of atmospheric radon. Radon-222, the gaseous daughter of naturally occurring radium and uranium, is continuously released from the earth's surface, thus maintaining an atmosphere reservoir. The long lived daughter of radon,  $Pb^{210}$ , returns to earth, gradually decaying to its alpha emitting daughter product  $Po^{210}$ . The levels of  $Po^{210}$  in grass samples were compatible with the known rate of deposition of  $Pb^{210}$  in rainfall; this in turn was compatible with estimates of radon release into the atmosphere. All the alpha activity of kidney from lambs grazing such herbage was due to polonium-210.—M. K. LLOYD.

Grigoryan, M. S. & Brutyan, A. S. (1959). [Effect of ionizing radiation on blood proteins in pigs.]—*Izv. Akad. Nauk Armyan. SSR, Ser. biol.* 12, No. 4 pp. 39-48. [In Russian.] 1237

Decreases in blood proteins, particularly albumins and beta globulin, were observed in pigs given a dose of 230-400 roentgens.

—M.G.G.

Handford, S. W. (1960). **The acute radiation syndrome in dogs after total-body exposure to a supralethal dose of ionizing radiation.**—*Radiation Res.* 13, 712-725. [Part of author's summary.] 1238

The well-known changes in the leucocyte picture were observed: early abortive leucocytosis was followed by rapidly progressive leucopenia until only a negligible number of white cells were present at 12 to 18 hours before death. No significant changes in serum electrolyte or protein levels were observed that could be interpreted as contributing to death. Significant reductions in total blood volume brought about by a reduction in red cell mass

and a relatively greater reduction in plasma volume occurred only in the premortal stage—10 hours or less before death—and only in a few instances were the reductions in blood volume of the magnitude to be considered intolerable. Both hepatic and renal blood flow were well-maintained until shortly before death, when a general collapse of the circulation occurred.

Sorensen, D. K., Bond, V. P., Cronkite, E. P. & Perman, V. (1960). **An effective therapeutic regimen for the hemopoietic phase of the acute radiation syndrome in dogs.**—*Radiation Res.* 13, 669-685. [Authors' summary modified.] 1239

Administration of large amounts of fresh whole blood to control bleeding, the judicious use of antibiotics to control infection, and parenteral fluids to combat dehydration was successful in reducing mortality from nine of ten untreated controls to two of ten in the treated group. The dogs were exposed to 400 r of X-irradiation.

Regeneration of the bone marrow as reflected by peripheral blood counts commenced about 23-30 days after exposure. Leucocytes appeared several days earlier than the platelets in all dogs. The rate of regeneration was different in the treated dogs and was slower in the four smaller dogs. The pre-irradiation platelet, leucocyte, and r.b.c. levels were not reached at the end of 100 days in these four dogs. The greater degree of effect seen in smaller dogs is discussed in terms of the greater tissue, or adsorbed dose received by these animals with a given air exposure dose.

Khairy, M. (1960). **Effects of chronic dieldrin ingestion on muscular efficiency of rats.**—*Brit. J. industr. Med.* 17, 146-148. 1240

Rats given 25 and 50 p.p.m. dieldrin in food developed progressive deterioration of muscular efficiency, although the drug had no apparent effect on body weight or food intake. —R.M.

Gentile, G., Venturoli, M. & Gasparini, U. (1960). **L'elettroforesi su carta applicata alla clinica canina. [Paper electrophoresis in canine practice.]**—*Vet. ital.* 11, 482-511. [Summaries in English, French and German.] 1241

Serum samples from 166 dogs with various diseases were examined by electrophoresis and results were compared with normal protein values. The possible applica-

tions of paper electrophoresis for diagnosis and prognosis are discussed.—T.E.G.R.

Espersen, G. (1960). Dilatatio et dislocatio caeci bovis. [**Dilatation and displacement of the caecum in cattle.**]—Nord. VetMed. 12, 669-690. [In Danish. Summaries in English, French and German. English summary modified.] 1242

The author describes a relatively unknown disease in cattle, in which the caecum is dilated and displaced. The disease is apparently most frequent in cows in late pregnancy, and in one case dislocation of the dilated caecum occurred simultaneously with extra-omental pregnancy. The symptoms usually resemble those of intestinal obstruction: sudden loss of interest in food and drink, failure to defaecate, colic pains, with normal temperature, pulse and respiration. Diagnosis is established by rectal exploration. Surgical treatment consists of right-sided laparotomy and incision into the caecum with removal of the contents. Complete recovery often occurs within a week. However, a follow-up of the author's cases showed that the cows were eventually fattened for slaughter.

I. Terlecki, S. & Markson, L. M. (1961). **Cerebrocortical necrosis in cattle and sheep.**—Vet. Rec. 73, 23-27. 1243

II. Spence, J. B., Stevens, A. J., Saunders, C. N. & Harris, A. H. (1961). **Cerebrocortical necrosis in sheep and cattle. The clinical syndrome.**—Ibid. 28-33 & 34. [Authors' summaries modified.] 1244

I. The paper describes a nervous disease of cattle and sheep, characterised by circling, progressive ataxia, decubitus, nystagmus, hyperaesthesia, tonic spasms, opisthotonos, coma and usually ending in death; morbidity was low, mortality very high. Disseminated necrosis of the cerebral cortex was found in all the cases studied. Lesions in other parts of the brain were inconstant. The clinicopathological picture had all the appearance of a distinct entity to which the name cerebrocortical necrosis has been given. Attempts to transmit the disease by experimental inoculation failed. Study of the cerebral lesion suggests that its pathological basis is anoxia, but the cause has not been determined.

II. The authors described the clinical syndrome of this disease, 21 outbreaks of which were encountered in sheep and 12 in calves in East Anglia between November 1958

and July 1960. The exact cause remains obscure.

Anon. (1960). **Kuru.**—Brit. med. J. December 17th, 1796-1797. 1245

Kuru is a fatal degenerative nervous disease that in some ways resembles scrapie [*V.B.* 30, 703 & 2332]. It appears to be due to a semi-lethal gene recessive in men and dominant in women.—M.G.G.

Vukelić, E., Rapić, S. & Gereš, V. (1960). O nekim pojavama osteopatija i artropatija kod importiranih plemenitih pasmina svinja. [**Diseases of bones and joints in imported pigs in Yugoslavia.**]—Vet. Arhiv 30, 144-154. [In Croat. Summaries in English and German.] 1246

Among bone and joint diseases observed in imported breeding pigs, there was separation of the epiphysis in femur, tibia and fibula, purulent osteomyelitis in the phalanges, often with foot rot, and purulent arthritis in the fetlock joints. *Corynebacteria* and streptococci in pure or mixed culture were commonly isolated.—E.G.

Appleby, E. C. & Siller, W. G. (1960). **Some cases of gout in reptiles.**—J. Path. Bact. 80, 427-430. [Authors' summary modified.] 1247

Nine cases of gout in reptiles (7 tortoises, an alligator and a lizard) are described. Eight had deposits of urate-like material in the joint capsules and three had deposits on the viscera. A brief description of the renal pathological appearances is given and the condition is compared to that which commonly occurs in the fowl.

Butură, I., Sirbu, Z., Bangău, S., Jitaru, G., Precup, O. & Boca, R. (1960). Studiul nefritei enzootice la bubaline. [**Endemic nephritis in buffaloes.**]—Lucr. Inst. Pat. Igienă anim., București 10, 151-160. [In Roumanian. Summaries in French and Russian.] 1248

Extending their previous investigation [*V.B.* 30, 2334] the authors examined urine from 568 buffaloes and found evidence of nephritis in 13%. Repeated examinations of the animals and of urine over 8 months confirmed the presence of chronic nephritis. Geographical distribution was studied: the disease was common in cool upland valleys and the authors believed that exposure to cold played a major role in the causation of nephritis.—R.M.



## POISONS AND POISONING

Gracey, J. F. & Todd, J. R. (1960). **Chronic copper poisoning in sheep following the use of copper sulphate as a molluscicide.**—Brit. vet. J. 116, 405-408. [Authors' summary modified.] 1249

In an outbreak of chronic copper poisoning 6 of 95 ewes died after grazing pasture previously sprayed with 1% copper sulphate solution as a molluscicide in liver fluke control.

Copper contents of herbage up to 200 p.p.m. in the dry matter were recorded and these high levels persisted throughout the dormant winter period (up to five months after spraying) despite heavy rain and, in some cases, flooding.

Eppson, H. F., Glenn, M. W., Ellis, W. W. & Gilbert, C. S. (1960). **Nitrate in the diet of pregnant ewes.**—J. Amer. vet. med. Ass. 137, 611-614. [Authors' summary modified.] 1250

Feeding oat hay containing an average of 0.8% potassium nitrate ( $\text{KNO}_3$ ) to sheep during pregnancy had no harmful effects on weight of adult sheep or on lambs born during the feeding period. Lucerne pellets containing 1.2%  $\text{KNO}_3$  had no harmful effects when fed from the start of lambing until lambs were 2 to 4 weeks old.

There was no significant difference in the methaemoglobin (MHb) content of the blood of sheep fed good-quality oat hay containing 0.21%  $\text{KNO}_3$ , and that of sheep fed oat hay containing 0.8%. There was also no significant difference in the MHb content in sheep fed lucerne pellets containing 0.2 and 1.2%  $\text{KNO}_3$ .

The MHb determinations should be made as soon as possible after the blood sample has been obtained, especially when there is a high MHb content, because such samples lost about 22% of their MHb content when left in the refrigerator for 24 hours.

The  $\text{KNO}_3$  content of samples of oat hay (from a single stack) varied from 0 to 2%. This variation makes it difficult to make any recommendations as to the safety of using any lot of oat hay or straw for livestock feeding unless it is adequately sampled.

Nový, J. (1960). K alimentárním intoxikacím, vyvolaným řepnou silází u skotu. [**Ensiled sugar beet pulp poisoning in cattle.**]—Vet. Čas. 9, 439-446. [In Czech. Summaries in English, French, German and Russian.] 1251

N. described poisoning with sugar beet

pulp silage in 32 cattle, seen over eight years. Toxicity of silage was ascribed to its lactic acid and potassium content. One cow died, eight recovered spontaneously, and 23 after i/v inj. of 20-40 ml. of 25% caffeine sodium benzoate and 500 ml. of 10% calcium borogluconate.—E.G.

Buck, W. B., Dollahite, J. W. & Allen, T. J. (1960). **Solanum elaeagnifolium, silver-leaved nightshade, poisoning in livestock.**—J. Amer. vet. med. Ass. 137, 348-351. 1252

Feeding trials on cattle, sheep and goats were done because the plant had been incriminated as a cause of losses among cattle in Texas. The green and the ripe fruit were poisonous for cattle in doses as small as 0.9 g./kg. body wt. It was less toxic for sheep, and goats tolerated ten times the toxic dose for cattle.—R.M.

Międźobrodzki, K. (1960). Przypadek zatrucia jałówek kropidłem wodnym (*Oenanthe aquatica*). [**Oenanthe aquatica poisoning in heifers.**]—Med. Wet., Warszawa 16, 608-609. [In Polish.] 1253

Eight heifers on marshy pasture, close to a lake, salivated profusely and became excited. Four died and one had to be killed. Chemical examination of stomach contents excluded arsenic and zinc phosphide poisoning; about 3.5% of those contents consisted of stems and roots of *Oe. aquatica*. A g.pig fed 2 g. of roots and stem of the plant, died about 20 min. with symptoms of cramp, tachycardia and increased respiratory rate.—M. GITTER.

Aspiotis, N., Lavrentiades, G. & Andreou, C. (1960). Etude pharmacodynamique de la plante toxique *Oenanthe silaifolia*. [**Pharmacology of Oenanthe silaifolia, a toxic plant of Greece.**]—Bull. Acad. vét. Fr. 33, 75-80. 1254

Toxic symptoms developed in 4 of 5 people, 8 hours after eating the cooked plant, and disappeared 3 hours after treatment with atropine. Decoctions and extracts of the whole plant and of its components were tested on animals. In 5 dogs and 5 rabbits i/v injection of a decoction of dried flowers caused bradycardia, marked sudden fall in arterial pressure, frequent superficial respiration, salivation and meiosis. Similar symptoms developed in a sheep injected with a decoction

of the whole plant. All the rabbits died and the other animals recovered. The flower was the most active followed, in decreasing order, by the root, fruit and stem.—T.E.G.R.

Campbell, J. G. (1960). **Variation of liver function in immature fowls and susceptibility to seneciphylline.**—J. Path. Bact. 80, 399-403. [Author's summary.] 1255

The individual variation in susceptibility of the livers of 5-9-week-old fowls to the hepatotoxic action of seneciphylline is directly proportional to the efficiency of that organ in clearing sodium bromosulphthalein from the blood, as determined immediately prior to exposure to the alkaloid. It is probable that

See also absts. 1240 (effect of chronic dieldrin ingestion on muscular efficiency in rats); 1310 (report, C.S.I.R.O.).

## PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

Nemeséri, L. & Széky, A. (1960). **Histopathologische Veränderungen in der Leber der mit Tetrachlorkohlenstoff parenteral behandelten Mäuse. [Histological changes in the liver of mice after subcutaneous injection of carbon tetrachloride.]**—Acta vet. Acad. Sci. hung. 10, 223-228. [In German.] 1257

Mice weighing about 22 g. were injected once a week with 0.03 ml.  $\text{CCl}_4$  or 0.06 ml. of a mixture of equal parts of  $\text{CCl}_4$  and liquid paraffin. They were killed for examination after 10, 15, 25, 40 or 60 treatments. A single treatment caused only transient fatty change and slight cell degeneration. Signs of cirrhosis did not commence until 15 injections had been given, and there was typical cirrhosis after 25 injections.—R.M.

Klimeš, B. & Dvořák, M. (1960). **Hämoglobin- und Eisenspiegel im Geflügel-Blutplasma nach Eisen-Applikation. [Haemoglobin and iron content of the blood plasma of fowls treated with iron.]**—Arch. Geflügelk. 24, 432-441. [Summary in English.] 1258

The haemoglobin content of the blood plasma of healthy fowls increased after i/m or i/v injection of 75 mg. of Fe in iron dextran soln., but not after oral administration. The iron content increased tenfold within 24 hours after the i/m treatment, then fell slowly to the original level a week later. —M.G.G.

Golberg, L., Martin, L. E. & Batchelor, A. (1960). **Biochemical changes in the tissues of animals injected with iron: acid phos-**

these variations reflect fluctuations in the oestrogen-androgen balance characteristic of this age group.

Trenchi, H. (1960). **Ingestion of Ammi visnaga seeds and photosensitization—the cause of vesicular dermatitis in fowls.**—Avian Diseases 4, 275-280. 1256

Vesicular dermatitis of fowls was reproduced by feeding seeds of *A. visnaga* and exposure to sunlight. Fowls fed the seeds and kept indoors or fed wheat from which the contaminating seeds had been removed remained normal. The disease was not reproduced by administration of scab material.

—M.G.G.

**phatase and other enzymes.**—Biochem. J. 77, 252-262. [Authors' summary modified.] 1259

Very high doses of iron, as iron-dextran or saccharated iron oxide, injected into mice bring about stunting of growth and hyperplastic enlargement of the liver. There is a disproportionately large, and apparently permanent, increase in the acid-phosphatase activity of liver. Enhanced activity is seen in the liver of rat and hamster, but not guinea-pig.

Injection of iron in doses less massive yet well above the clinical level, or the administration of sodium chloride solution or dextran, had no such result.

In mouse and rat the injection sites in muscle and in subcutaneous tissue have a raised acid-phosphatase activity after the administration of heavy doses of iron-dextran. The spleen and kidney of the mouse also show a higher level of acid phosphatase. Various enzyme activities in the siderotic liver were increased.

Missioux, L. M. (1960). **L'acétyl-méthionate de magnésium; quelques indications en médecine vétérinaire. [Veterinary applications of magnesium acetylmethionate.]**—Thesis, Paris (Alfort) pp. 57. 1260

Magnesium acetylmethionate was used as an adjuvant to specific therapeutic drugs for diseases involving the liver. It was indicated for horses with colic; cattle being treated with anthelmintics, sugar-beet poisoning, or milk fever; sheep with pregnancy toxæmia; dogs with eczema, hepatitis or digestive troubles;



and pigs with digestive disorders and oedema disease.—M.G.G.

Wright, W. W. & Harold, L. C. (1960). **Antibiotic residues in milk after parenteral and oral administration in cows.**—J. Amer. vet. med. Ass. 137, 525-533. 1261

After a single i/m or i/v injection into cows, tetracycline (dose of 2 mg./lb. body wt.) was detected in the milk for up to 30 hours. After a single i/m inj., potassium penicillin (10,000 units in aq. suspension per lb.) was detected for up to 30 hours; procaine penicillin (10,000 units in aq. suspension per lb.) for up to 78 hours; procaine penicillin (10,000 units/lb.) plus dihydrostreptomycin, for 54 hours; penicillin diethylaminoethylester hydriodide (10,000 units/lb.) plus dihydrostreptomycin, for 48 hours; procaine penicillin (10,000 units in oil per lb.) with aluminium monostearate, for 8 days; and benzathine penicillin (10,000 units in aq. suspension per lb.) with or without procaine penicillin, for 10 days. During oral administration the milk contained no detectable amounts of penicillin (dose of 5 million units daily); bacitracin (21,000 units daily); or streptomycin (1 g. daily); but small amounts of tetracycline (10 mg./lb. daily); and considerable amounts of chlortetracycline (0.5-10 mg./lb.).—M.G.G.

See also *absts.* 1017 (antibiotics in calf diarrhoea); 1026 (effect of furazolidone on *S. pullorum* and agglutination titres); 1029 (peccid in brucellosis); 1049 (chlorpromazine in dog tetanus); 1071 (actinomycosis); 1074 (bovine contagious pleuropneumonia); 1076 & 1078-1079 (trypanosomiasis); 1080 (human trichomoniasis); 1125 (chloramphenicol in ovine contagious ecthyma); 1129 (tetracycline in porcine virus pneumonia); 1146 (chemotherapy of psittacosis); 1154-1156 & 1158 (parasitocides and repellents); 1159-1160, 1165-1168, 1174-1175, 1178-1179, 1181, 1183, 1185-1186 & 1240 (anthelmintics); 1220 (acetyl methionine in ketosis).

## PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

Walker, C. A. (1960). **I. The skin characters of some breeds of indigenous African cattle. II. The population, morphology and evolutionary trends of the apocrine glands of African indigenous cattle.**—J. agric. Sci. 55, 119-121 & 123-126. 1264

I. The papillary layer was 0.916 mm. thick in zebu cattle (16% of the total skin thickness), compared with 1.74 mm. in *Bos taurus* (29% of the total skin thickness).

II. The apocrine glands were studied in 14 breeds of African cattle of 4 races. The density and volume of the glands varied considerably. Of the 2 types of gland that were found, the club-shaped was suggested to be more primitive than the baggy type. Gland volume was correlated closely with heat tolerance.—M.G.G.

Krause, W. & Illing, K. (1960). **Zur Anwendung des Muskelrelaxans Guajakol-Glycerin-äther-Grünau (GGG) beim Pferd. [The muscle relaxant guaiacol glyceryl ether for horses.]**—Mh. VetMed. 15, Sonderheft No. 2 pp. 22-26. 1262

This drug was tried on 45 horses submitted to various surgical operations. The horses first received an i/v inj. of 50-100 mg. chlorpromazine plus 10-20 ml. "Polamivet" followed immediately by a suitable dose of chloral hydrate soln. through the same needle. The animal was then cast and prepared for operation. Because of the short action of guaiacol glyceryl ether, it was injected i/v just before starting the operation in a dose of 15-20 ml. of 20% soln. per 50 kg. body wt. Satisfactory muscle relaxation, lasting 15-45 min., was obtained.—R.M.

Vice, T. E. & Lawrence, W. A. (1960). **A preliminary report on Rapacodin.**—Vet. Med. 55, No. 10 pp. 61-64. 1263

In surgery of dogs and cats, dihydrocodeine relieved pain without significant depression of respiration, circulation or cardiac function; in effective dosage it was not significantly less potent than morphine and was without side effects. It was not toxic in dogs and cats at 3 times the therapeutic dosage.—E.V.L.

Germanyuk, Y. L. (1959). **[I. Pyrophosphatase activity in blood of healthy and sick cows injected with glucose or insulin. II. Influence of intravenous injection of glucose on plasma ribonuclease in cattle. III. Effect of insulin on excretion of glutamine in the urine of cows.]**—Nauk. Pratsi L'viv. zoovet. Inst. 10, 235-242; 243-248 & 249-254. [In Ukrainian. Summaries in Russian.] 1265

The pyrophosphatase activity of blood was 4-5 times higher in horses and dogs than in sheep and cows, while pigs occupied an intermediate position. I/v inj. of glucose at between 0.125 and 1 g./kg. body wt, as 40% soln. reduced pyrophosphatase activity in cattle, while s/c inj. of 100-200 i.u. of insulin increased it. In cows with atony of the fore-stomachs, injection of 200 i.u. insulin was followed by rapid recovery and rise in blood pyrophosphatase.

I/v inj. of 40% glucose soln. at the same dosage as before reduced ribonuclease activity in bovine plasma.

Glutamine was present in urine of horses, pigs and cattle in amounts equivalent to between 6 and 41 mg. nitrogen per 100 ml. Insulin injection increased the glutamine content of cows' urine by about 25% after 3 hours.—R.M.

Golovatskii, I. D. (1959). [Adenosine triphosphatase activity in the blood of cows with atony of the forestomachs, treated with glucose or insulin.] — *Nauk. Pratsi L'viv. zoovet. Inst.* 10, 259-263. [In Ukrainian. Summary in Russian.] 1266

There was 4-7 times more adenosine triphosphatase activity in erythrocytes and whole blood of horses than in cows. Insulin therapy of cows with ruminal atony led to an appreciable rise in activity of the enzyme and in the blood concentration of adenosine triphosphate.—R.M.

Mount, L. E. & Rowell, J. G. (1960). **Body size, body temperature and age in relation to the metabolic rate of the pig in the first five weeks after birth.** — *J. Physiol.* 154, 408-416. 1267

A detailed account of work already published in brief [*V.B.* 31, 548].—R.M.

Kadyrov, G. K. (1959). [Blood picture of zebu cattle in Azerbaijan.] — *Izv. Akad. Nauk Azerbaj. SSR, Ser. biol.* No. 3 pp. 69-75. [In Russian.] 1268

The blood picture of zebu cattle was compared with that of other breeds of cattle in Azerbaijan. The high phagocytic activity of the leucocytes in zebu cattle explains their good resistance to infections.—M.G.G.

Archer, R. K. (1960). **Studies with eosinophil leucocytes isolated from the blood of the horse.**—*Brit. J. Haematol.* 6, 229-241. 1269

A method of obtaining eosinophiles at about 70% purity was described. A water-soluble extract of the cells reduced the oedematous and eosinophilic response to i/d injections of histamine and to specific antigen in hyperimmune animals. To a lesser extent it also reduced the oedematous response to 5-hydroxytryptamine.

Holm, L. W., Katz, Y. J., Parker, H. R., Chesley, L. C. & Assali, N. S. (1960). **Experimental hypertension in pregnant sheep.**—*Amer. J. Physiol.* 199, 633-636. 1270  
Sheep with spontaneous or experimental

pregnancy toxæmia do not develop hypertension despite the presence of severe renal ischaemia. Pregnant dogs and rats do not develop hypertension when the renal arteries are constricted. However, it developed in ewes when both renal arteries were clamped; pregnancy did not alter the response to clamping.—R.M.

Douglas, S. D. (1960). **Correlation between the surface electrocardiogram and air sac morphology in the White Leghorn rooster.**—*Amer. J. Physiol.* 199, 355-359. 1271

Air sacs blocked the detection of heart currents by electrocardiograph electrodes placed on defined parts of the body.—R.M.

Sewell, I. A. (1960). **Seasonal variation of the phagocytic activity of the reticulo-endothelial system.**—*Immunology* 3, 371-375. [Author's summary modified.] 1272

Observations on healthy male albino mice over 24 months showed a significant seasonal variation: there was high activity in summer and low activity in winter. The degree of variation was constant for particular seasons in succeeding years. Assessment of phagocytic activity was made by measuring the rate of absorption of colloidal carbon from the blood stream. The causes of the variation are attributed to environmental factors and the individual mechanisms are discussed. A monthly correction factor is suggested so that investigations of phagocytic activity at different times of the year may be compared.

Oyaert, W. & Bouckaert, J. H. (1960). **Quantitative aspects of food digestion in the rumen.** — *Zbl. VetMed.* 7, 929-935. [In English. Summaries in French, German and Spanish. English summary modified.] 1273

By means of an omasal cannula it was possible to measure the extent of digestion of dry matter and nitrogen in the rumen. The amount of dry matter digested and absorbed in the rumen varied from 54 to 75% of the digestible dry matter. The concentration of ammonia in the rumen was related to the proportion of nitrogen intake which was lost in the reticulo-rumen and so could not be recovered at the omaso-abomasal orifice.

Stevens, C. E. & Sellers, A. F. (1960). **Pressure events in bovine esophagus and reticulorumen associated with eructation, deglutition and regurgitation.**—*Amer. J. Physiol.* 199, 598-602. [Authors' summary modified.] 1274

From 30 experiments on eight adult cows it was found that the peristaltic wave of



oesophageal contraction associated with swallowing of saliva travelled at a velocity of about 42 cm./sec. During rumination the aspiratory movement that initiates regurgitation was followed by an antiperistaltic wave of oesophageal contraction which travelled at about 107 cm./sec. Eructation was accompanied by oesophageal pressure wave having two components.

Brownlee, A. & Elliot, J. (1960). **Studies on the normal and abnormal structure and function of the omasum of domestic cattle.**—Brit. vet. J. 116, 567-573. [Authors' summary modified.] 1275

Special attention was drawn to the thin epithelium over the non-horny papillae and to the mucous connective tissue core of all the papillae; both of these probably aid absorption.

A macroscopic examination of the omasum of 578 slaughtered cattle was made. Of these 36% showed two or more folds stuck together by patches or a diffuse layer of dry food; 48% showed some degree of depapillation of a varying number of folds, the area affected being that around the centre of the free edge; 16% showed some degree of fenestration; a small number showed scar formation in one or more folds.

Microscopic examination was made of material from the omasum of 134 cattle. The adherent folds did not show obvious microscopic change, except slight increase in shed keratinized cells. A wide range of "rete-peg" formation was found, the conditions of development of which were not clearly determined but very strong "rete-peg" formation would appear to be definitely abnormal. Scars were found in the folds of a few omasa and in such cases breaks in the continuity of the epithelium with infiltration of phagocytic cells into the surrounding tissues were found.

Oyaert, W. & Bouckaert, J. H. (1961). **A study of the passage of fluid through the sheep's omasum.**—Res. vet. Sci. 2, 41-52. [Authors' summary modified.] 1276

Omasal function in sheep was studied by means of an omasal cannula, using polyethylene glycol as a marker.

Part of the liquid leaving the reticulum passed straight to the abomasum the rest being retained in the omasum.

Rate of passage through the omasum was 462 ml. per hour for an intake of 1,000 g. dry matter. The pH and the chloride content of omasal liquid were higher than those of ruminal liquid. The carbon dioxide, sodium,

potassium and ammonia contents were lower.

The quantity of water absorbed from the omasum depended upon the molar concentration of the contents.

Carbon dioxide and sodium were absorbed rapidly and potassium was much more slowly. The chloride concentration of the omasal contents increased when the initial concentration was below 140 mg./100 ml. In all other cases chloride was absorbed.

Hill, K. J. (1960). **Abomasal secretion in the sheep.**—J. Physiol. 154, 115-132. [Part of author's summary.] 1277

It is concluded that the most important stimulus of gastric secretion in the sheep is the frequent passage of ingesta from the reticulorumen to the abomasum and that volatile fatty acids, particularly acetic acid, produced during rumen fermentation, may also play a part in the secretory response to feeding.

Harrison, H. N., Warner, R. G., Sander, E. G. & Loosli, J. K. (1960). **Changes in the tissue and volume of the stomachs of calves following the removal of dry feed or consumption of inert bulk.**—J. Dairy Sci. 43, 1301-1312. 1278

This is one of a series of papers describing work done on the influence of differing foods on the development of the stomachs of calves. Four groups of calves were fed thus (i) high hay and low concentrates (6 calves); (ii) high concentrates and low hay (6 calves); (iii) milk only and kept on a wooden platform with no bedding (2 calves); (iv) milk with bedding of shavings of which the calves ate freely after reaching one month of age (2 calves). At 16 weeks, two of each of the first two groups were destroyed and two of each of these groups were put on a milk diet (no bedding) and with the remaining two of each group kept for a period up to 22 weeks (reversal experiment).

The rumen-mucosa of calves in the reversal experiment regressed; so also did the rumen muscle but at a slower rate. No papillary development occurred in the milk-fed calves, but milk-fed calves bedded with shavings showed considerable rumen-muscle development. Well developed rumen mucosa had a lower N content than rumen-muscle. On the basis of these three differences, the authors conclude that the muscle and the mucosa in the rumen develop independently.

Gas formation did not occur in the shavings group and the pH of the contents here was 7.2. The figures for rumen contents

expressed as a percentage of the live weight were higher in the high-hay than in the high-concentrates group, whereas rumen-mucosa development in these two groups was the reverse of this.—A. BROWNLEE.

Hilding, A. C. (1960). **Air-flow as an etiologic factor in metaplasia in the tracheobronchial tree.**—Arch. Path. 70, 550-561. [Author's summary modified.] 1279

H. examined histologically the normal respiratory epithelium taken from the carina (at the bifurcation), and from the left upper lobe bronchus of 118 human beings and 11 cows. There was little or no evidence that the impact of inflowing air caused metaplasia or other variations in the form of epithelium at these sites. When the epithelium showed damage (as most specimens did), from inflammatory or other processes, there was a suggestion that the damage was greater where the impact of air would likely be greatest. One small lesion found among the 11 cow specimens was unlikely to have been caused by air-flow.

Harrison, M. & Fraser, R. (1960). **I. Bone metabolism in rats, studied with stable strontium. II. Bone structure and metabolism in calcium-deficient rats. III. The parathyroid glands and calcium deficiency in the rat.**—J. Endocrin. 21, 191-196; 197-205 & 207-211. [Authors' summaries modified.] 1280

I. The retention of a dose of stable strontium given intraperitoneally to rats, measured after 24 hours, provides an estimate of the rate of bone formation. Retention of strontium varied with the age of the rat, but not with sex.

II. Pure calcium deficiency produces osteoporosis (bone atrophy) in rats, while vitamin D deficiency as well as calcium deficiency leads to osteomalacia (thin bones with wide osteoid seams). The retention of a dose of strontium by rats with osteoporosis was greater than normal, indicating rapid bone formation. The immediate cause of the bone thinning must therefore be an increase in the rate of bone resorption, contrary to the usual concepts of osteoporosis.

III. In rats maintained on a diet deficient in calcium but otherwise adequate, there is increased parathyroid activity. The osteoporosis of calcium deficiency is the result of this activity. Hypoparathyroidism protects the skeleton from the osteoporosis due to calcium deficiency, but at the expense of somatic and skeletal growth.

Pullman, T. N., Lavender, A. R., Impi Aho & Rasmussen, H. (1960). **Direct renal action of a purified parathyroid extract.**—Endocrinology 67, 570-582. [Authors' summary modified.] 1281

To determine whether parathyroid hormone evokes phosphaturia by a direct effect on the kidney or acts indirectly at an extra-renal site, a highly purified parathyroid extract was administered by slow infusion into one renal artery in the dog. In most of the dogs the resultant phosphaturia was exclusively or preferentially unilateral. No systematic changes in renal haemodynamics or plasma phosphate concentration were observed during 3-4 hours of intra-renal infusion. The phosphaturia resulted from a diminished rate of phosphate reabsorption, both absolute and relative to the amount of phosphate filtered. The action on the kidney was therefore direct.

Henricson, B. & Ullberg, S. (1960). **Effects of pig growth hormone on pigs.**—J. Anim. Sci. 19, 1002-1008. [Abst. from authors' summary.] 1282

Between 24 and 132 days of age, pigs (females and castrated males) were given daily doses of pig pituitary growth hormone, at 0.1, 0.2, or 0.05 mg./kg. body wt. The treated females had a significantly greater increase in weight. No difference in feed consumption between the groups was detected; but this was not measured separately for the females. Blood glucose and phosphorus levels were unaffected.

Brush, M. G. (1960). **The effect of ACTH injections on plasma corticosteroid levels and milk yield in the cow.**—J. Endocrin. 21, 155-160. [Author's summary modified.] 1283

In the cow, a single injection of corticotrophin (ACTH) produced rapid rise in plasma 17: 21-dihydroxy-20-keto-corticosteroids, and then an equally rapid fall. This was followed by a more gradual fall to pre-injection levels which were reached within 24-48 hours of the start of the experiment. The presence of cortisol in the blood samples was confirmed by chromatographic examination. Detectable amounts of other corticosteroids were not found.

The ACTH injections produced a very definite fall in milk yield. Return to generally steady levels took 3 days in one case and more than 7 days in another.



Gabel, A. A. & Papp, E. (1960). **Thymectomy of the calf.**—Amer. J. vet. Res. 21, 1126-1128. [Authors' summary modified.] 1284

Thymectomy was performed on 10 calves. No infection resulted from the surgery. Three of the operations were done without opening the thorax (splitting the sternum). At necropsy two months after surgery, thymic tissue was found in the thorax in 2 of these calves but not in the third.

Of the 7 calves in which the sternum was split, 3 died (one as a result of surgical shock and prolonged anaesthesia; one because of failure of the endotracheal tube cuff; one from haemorrhage due to the accidental cutting of a thoracic vessel). In 2 of the calves examined P.M. six months after surgery, no thoracic thymus could be found, but a small mass of thymic tissue was found in the cervix of one of them. Further studies are being done on the remaining 2 calves; blood counts indicate that they probably have no retained thymic tissue.

Hafez, E. S. E., Ensminger, M. E. & Eshiet, N. E. (1960). **Endocrine histology as effected by plane of nutrition in pregnant gilts.**—Acta endocr., Copenhagen 35, 441-453. [In English.] 1285

Pigs were reared on a high or a low plane of nutrition for ten generations. Gilts of the tenth generation were slaughtered 38 or 100 days after coitus. Plane of nutrition had no influence on weight, size or histology of adrenal, pituitary and thyroid glands.—R.M.

Toscano, G., Gili, G. & Gaidano, R. (1960). Contributo allo studio della composizione

minerale del peli in Bos taurus, L. Ricerche sul contenuto di zinco nei peli di gruppi etnici allevati in uguali ed in differenti "nicchie ecologiche". [**Zinc in the hair of cattle of different breeds in different locations.**] — Zootec. e Vet. 15, 136-142. [Summaries in English, French and German.] 1286

A comparable study of the zinc content of the hair of two breeds of cattle in similar and in different environments. Differences were not statistically significant.—T.E.G.R.

Koga, O. & Matsuo, T. (1960). [**Variation of calcium, potassium and sodium concentration in the shell gland fluid during egg formation in laying hens.**] — Sci. Bull. Fac. Agric. Kyushu 18, 35-40. [In Japanese. English summary modified.] 1287

Fluid was collected by a glass catheter inserted into the shell gland during stages of egg formation, i.e., the periods of "membranous", "slightly calcified" and "hard shell" of the forming egg and the quiescent period after oviposition.

Fluid secretion seemed to be greatest during the membranous period. Calcium concentration in the fluid was then at its lowest, but it increased during shell deposition. Potassium concentration was high in both the hard-shell egg period and after oviposition, while it was low in the membranous period, although it was still higher than the serum concentration.

Insertion of a glass catheter into the shell gland caused some disturbance of egg laying, such as cessation of laying, delayed oviposition or premature expulsion.

## PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

Hobbs, B. C., Reeves, J. C., Garside, J. S., Gordon, R. F., Barnes, E. M., Shrimpton, D. H. & Anderson, E. S. (1960). **Antibiotic treatment of poultry in relation to Salmonella typhi-murium.** — Mon. Bull. Minist. Hlth Lab. Serv. 19, 178-193. 1288

A strain of *S. typhi-murium* resistant to chlortetracycline grew more rapidly than spoilage organisms at 22°C. on the skin of dressed poultry that had been immersed in slush ice containing 10 p.p.m. chlortetracycline. Strains of *S. typhi-murium* fed to chickens in diets containing chlortetracycline gradually developed resistance to the antibiotic. Of 627 strains of *S. typhi-murium* from human,

animal and food sources, 10 were resistant to chlortetracycline.—M.G.G.

Mozgov, I. E. (1960). [**Survey of research and teaching work at the Moscow Veterinary Academy.**] — Veterinariya, Moscow No. 11 pp. 19-23. [In Russian.] 1289

This is largely a description of current activities, with no details of research in progress. Among the 3,480 students at present at the Academy, 794 were studying veterinary medicine, 482 zootechny, 1,461 were external veterinary students, 180 were attending post-graduate courses. The staff was composed of four academicians, 4 "honoured scientists", 27 professors (doctors of science), 67 candidates

of science, 61 assistants and 17 lecturers. The author is Rector of the Academy.—R.M.

Friedmann, J.-C. (1960). *Mécanisme de l'hydroémie bovine. [Mechanism of hydraemia encountered in slaughtered cattle.]*—Thesis, Paris (Alfort) pp. 42. 1290

Cattle with hydraemia (anasarca or watery flesh) had histological lesions of the liver, pituitary gland and adrenal glands,

*See also absts.* 1027 (food poisoning in England and Wales, report of the Public Health Laboratory Service); 1036 (brucellosis and meat hygiene); 1037-1038 (human brucellosis); 1048 (canicola fever in pigs and man); 1107 (tick-borne encephalitis virus in milk and effect of pasteurization); 1142-1145 (psittacosis); 1188 (*Dipetalonema websteri* in imported kangaroo meat); 1308 (report of the Ministry of Health, Great Britain).

## REPRODUCTION AND REPRODUCTIVE DISORDERS

Blackshaw, A. W. (1960). *The effects of pH, tonicity and the temperature of glycerolisation on the revival of ram and bull spermatozoa after freezing to -79°C.*—Aust. vet. J. 36, 376-379. [Author's summary modified.] 1291

Ram and bull spermatozoa frozen in glycerolphosphate media survive best at a pH near neutrality. Isotonic media are most suitable for freezing ram and bull spermatozoa. Glycerol concentrations of 3.75% and 7.50% are suitable for freezing spermatozoa particularly in isotonic media. Using egg yolk-citrate media glycerol is best added to ram spermatozoa at 29°C.; although bull spermatozoa tolerate a temperature range of 5° to 29°C.

Dun, R. B., Waheed Ahmed & Morratt, A. J. (1960). *Annual reproductive rhythm in Merino sheep related to the choice of a mating time at Trangie, Central Western New South Wales.*—Aust. J. agric. Res. 11, 805-825. [Authors' summary modified.] 1292

Ovaries from slaughtered Merino ewes were examined for a year commencing April 1954. A seasonal rhythm was demonstrated for the percentage of ewes ovulating and for the percentage of multiple ovulations. The seasonal peak was in March-April, with a trough in November-December.

Data were compared from a series of autumn and spring matings over the years 1953-59 using genetically comparable flocks of similar age distribution, mated by identical methods. The overall incidence of oestrus was higher in the first 3 weeks of mating (artificial insemination) in the autumn. The patterns of incidence of oestrus also differed, oestrus being

hypofunction of the thyroid gland, a blood protein content 15% below normal, and an increase in the hyaluronic acid content of the connective tissue. The condition is considered to be due to stress. The damaged liver synthesizes less protein, reducing the osmotic pressure of the blood, and the gland changes lead to excessive formation of hyaluronidase which depolymerizes the connective tissue. Water is then absorbed by the connective tissue from the blood.—M.G.G.

much higher at the commencement of mating in the autumn. Differences between years in the incidence of oestrus were more pronounced in the spring, low incidence being correlated with poor nutrition.

The conception rate for autumn-mated ewes was 10% higher than for spring-mated ewes. Little difference was observed in the number and motility of spermatozoa used at the seasonal matings.

Lambing percentages strongly favoured the autumn mating: 15% more lactating ewes, 25% more twins mothered, 37% more lambs mothered and 33% more lambs weaned. There was little difference between seasons in ewe mortality prior to and during lambing, or in deaths of lambs between mothering and weaning.

The weaning weight of lambs tended to be slightly higher for autumn matings. These differences had almost disappeared by 17 months of age.

It is concluded that autumn breeding (commencing in March-April) will give improved lambing results in central western New South Wales.

Lanzkowsky, P. (1960). *Effects of early and late clamping of umbilical cord on infant's haemoglobin level.*—Brit. med. J. December 17th, 1777-1782. 1293

The average haemoglobin content of the blood at 13-24 and 72-96 hours of age was significantly lower in 63 infants in which the umbilical cord was clamped immediately after birth, than in 70 infants in which the cord was clamped after it had been stripped. At 3 months the haemoglobin content of the two groups was almost identical. No other effect was observed.—M.G.G.



Pozzi, L. (1960). La eliminazione urinaria delle frazioni androgene Zimmermann reagenti nel corso del ciclo estrale e durante i primi mesi di gravidanza nelle bovine. [**Androgens detectable by Zimmermann's test in the urine of cows during the oestrous cycle and during early pregnancy.**] — *Zootec. e Vet.* 15, 149-157. [Summaries in English and French.] 1294

The rate of androgen excretion in the urine decreased immediately before oestrus; it increased slightly but constantly after conception and reached a transitory high level after the third month of pregnancy.

—T.E.G.R.

I. Adler, J. H. & Trainin, D. (1960). [**A hyperoestrogenic syndrome in cattle.**] — *Refuah vet.* 17, In Hebrew: pp. 58-67. In English: p. 115. 1295

II. Ayalon, N. & Adler, J. H. (1960). [**The use of mice in the Astwood test for determination of small quantities of oestrogens.**]—*Ibid.* In Hebrew: pp. 68-69. In English: p. 107. 1296

I. In 1957, a tuberculous dairy herd which, over the previous 18 years, had shown a high incidence of ovarian cysts and oestrus disturbances, low fertility and unexplained abortions, was completely disbanded and re-established with 80 pregnant Holstein-Friesian heifers from Holland. Within 2 years, 21 of these animals had been culled for sterility problems, 18 were diagnosed as having cystic ovaries, and symptoms of hyperoestrogenism (including heat periods in 22 pregnant cows) were observed in others. The conception rate was only 23.7%. Amongst 21 of the heifers sired in Holland but born in Israel, steer-like configuration and fat distribution, bull-like forehead, large mammary glands, enlarged uterus and vulva, and cystic ovaries were observed within 18 months. The appearance of the reproductive disturbances coincided with the period at which fresh lucerne was available and assay showed that the lucerne contained significant amounts of oestrogen. When two virgin heifers were fed exclusively on lucerne hay or fresh lucerne from the farm, similar hyperoestrogenic symptoms began to appear and cystic ovaries and abnormal sexual activity developed. P.M. examination confirmed the clinical findings and showed a preponderance of highly granular acidophilic cells in the adenohypophysis. As a hereditary factor to account for the cystic ovaries can be excluded, the cause of the hyperoestrogenic

syndrome appears to have been the lucerne feeding.

II. For assay of oestrogen, the use of mice (17-21 days old) instead of rats in Astwood's test increases its sensitivity tenfold. A direct logarithmic relationship is apparent between doses of 0.0003  $\mu$ g. and 0.01  $\mu$ g. oestradiol and the uterine weight increase.

—A. ACKROYD.

Adler, J. H. & Trainin, D. (1960). **Diet and bovine fertility.** — *Vet. Rec.* 72, 1171-1172. 1297

Workers in Israel have reported a type of infertility in cattle associated with the feeding of lucerne which is considered to have oestrogenic activity. Affected cows may have cystic ovaries or show signs of ovarian dysfunction. As legumes have a high calcium content, this syndrome could mistakenly be ascribed to calcium excess.—E. J. CASTLE.

Churý, J. (1960). K otázce estrogenního účinku krmné kapusty. (*Brassica oleracea* var. *acephala*). [**Oestrogenic effect of kale (*Brassica oleracea* var. *acephala*).**] — *Vet. Čas.* 9, 484-490. [In Czech. Summaries in English, French, German and Russian.] 1298

In an attempt to clarify the role of kale in the aetiology of reproductive disorders in cows, C. produced oestrus in eight spayed rats by intravaginal application of oily extracts from kale. Oral doses of extracts produced considerable enlargement of the uterus in 14 infantile mice. The oestrogenic effect of 1 kg. of kale was equivalent to 24  $\mu$ g. of oestradiol benzoate.—E.G.

Legault-Démare, J., Mauléon, P. & Suarez-Soto, M. (1960). Étude de l'activité biologique in vitro des hormones gonadotropes. II. Stimulation in vitro du corps jaune de brebis par l'hormone gonadotrope sérique de jument gravide. [**Stimulation in vitro of the corpus luteum of ewes by serum gonadotrophin.**]—*Acta endocr., Copenhagen* 34, 163-168. [In French.] 1299

From 22 corpora lutea of known age removed from sheep immediately on slaughter, slices 0.5 mm. thick were incubated in six similar-aged batches, three with and three without 20 or 40 i.u. pregnant mare serum. Progesterone production was estimated by Zaffaroni's chromatographic technique. The controls liberated  $13 \times 10^{-3}$   $\mu$ g. progesterone per mg. dry tissue, (corpora less than one day

old), rising to about  $50 \times 10^{-3} \mu\text{g.}$  at the 8th day and falling to 24 such units by the 12th and 5 by the 15th day. The effect of the PMS was to raise production by 126-165% up to and including the 12th day but by 465% from 15 day old corpora.—F. L. M. DAWSON.

Dow, C. (1960). **Oestrogen-induced atrophy of the skin in dogs.**—J. Path. Bact. 80, 434-435. [Author's summary.] 1300

Prolonged administration of stilboestrol to dogs or bitches leads to atrophy of all integumental structures—epidermis, hair follicles and glands—and to fibrosis of the dermis.

Taylor, W. & Scratcherd, T. (1960). **Progesterone metabolism in the cat.**—Biochem. J. 77, No. 3 p. 22P of Proceedings. 1301

Progesterone labelled with  $^{14}\text{C}$  (0.83-1.39 mg.;  $10.6 \times 10^6$  counts/min./mg.) was administered intravenously over 10 sec. to three anaesthetized male cats, and bile and urine collected for 4-5 hours by intubation of the gall and urinary bladders.—R.M.

Darcel, C. le Q., Niilo, L., Avery, R. J. & Bainborough, A. R. (1960). **Microphthalmia and macrophthalmia in piglets.**—J. Path. Bact. 80, 281-286. [Authors' summary modified.] 1302

Descriptions are given of macrophthalmia and microphthalmia in 3 new-born piglets of

a litter in which other cases occurred. The sire was a Canadian Yorkshire-Tamworth cross.

In the ciliary region of the macrophthalmic eyes, plaques were found which contained hyperplastic embryonic nervous and pigmented retina and cartilage cells. There was marked degeneration of the nervous layers of the retina outside the adenomatous area and no lens was found. There was massive haemorrhage into the eyeball and haemorrhagic cysts within the plaques. One macrophthalmic eye did not show these lesions and was in an early stage of embryonic development.

In the microphthalmic eyes, tissue on the posterior surface of the lens contained rosettes very similar to those occurring in retinoblastoma. One of the eyes also contained an area of apparently normal brain tissue. The retina showed degeneration as in the macrophthalmic eyes.

The cause of this congenital blindness is unknown.

Mustard, J. F., Rowsell, H. C., Robinson, G. A., Hoeksema, T. D. & Downie, H. G. (1960). **Canine haemophilia B (Christmas disease).**—Brit. J. Haematol. 6, 259-266. 1303

A Canadian family of Cairn terriers was investigated after four male dogs had been found to bleed excessively after operation or trauma. A clotting defect found in seven male dogs was pathologically and genetically similar to human haemophilia B.—R.M.

See also absts. 988 (granular vaginitis in cows); 1028-1041 (brucellosis); 1058 (orchitis-epididymitis in equines); 1087 (toxoplasma abortion in sows); 1120 (virus orchitis in bulls); 1121-1122 (bovine abortion); 1126 (ovine virus abortion); 1250 (nitrate in the diet of pregnant ewes); 1270 (hypertension in pregnant ewes); 1304 (artificial insemination in sheep); 1311 (report, Kenya); 1316 (book, diet in relation to reproduction and viability of the young in pigs).

## ZOOTEC HNY

Dun, R. B. (1960). **Artificial insemination in sheep. IV. Sterilisation of rams.**—Aust. vet. J. 36, 437-439. [Author's summary modified.] 1304

A simple operation for sterilizing ram lambs at normal marking time (3 weeks to 6 weeks of age) was described and its advantages discussed. One testicle is removed by traction. Semen transport from the remaining testicle is blocked by excising the cauda epididymidis, together with a small portion of the body of the testicle.

Fraser, A. F. (1960). **Spontaneously occurring forms of "tonic immobility" in farm animals.**—Canad. J. comp. Med. 24, 330-333. [Author's summary modified.] 1305

"Animal hypnosis" or "tonic immobility" has been recognized for some time in many species of animals and has been the subject of much interest and some experimental work. Many examples of locomotor inertia occurring spontaneously in farm animals appear to belong within the framework of "tonic immobility" states. Some inadequately understood veterinary clinical problems, e.g. the "downer cow", are held to be examples.



## MISCELLANEOUS

Anon. (1960). **Agriculture in the U.S.S.R. Statistical handbook.** pp. 666. Moscow: Gosstatizdat Tsentral'noe Statisticheskoe Upravlenie 14r. 60k. [In Russian.] 1306

The statistics given in this book are for 1959, with data of previous years for comparison. We are concerned here only with the tables that show the population and production of livestock (pages 263-382); there is no information about losses. The total populations on 1st January 1960 were 74.2 million cattle (33.9 million cows and 423,800 bulls), 53.4 million pigs, 136 million sheep, 7.9 million goats and 11 million horses. Horses and goats have decreased steadily since 1950 and all other stock has increased considerably. There were 278,000 camels (mostly in Kazakhstan, Uzbekistan and Turkmenia), 847,000 donkeys, 5,000 mules and 1.9 million reindeer. Artificial insemination was performed on 8.9 million cattle (a big increase since 1958) and 32.9 million sheep or goats. Poultry on collective

and state farms comprised 84.8 million fowls, 15.8 million ducks, 2.8 million geese and 414,000 turkeys. During 1959 the number of eggs incubated was 753,000 million, and the number of young birds hatched was 524,000 million. The average milk yield of a cow over a year was 1,800 kg., but yields of 4,000 kg. and over were achieved on 90 collective farms and 96 state farms.—R.M.

Anon. (1960). **Glossary of atomic terms. Prepared by Technical Writers Section of the Public Relations Branch, United Kingdom Atomic Energy Authority.** pp. 54. London: H.M. Stat. Off. 3s. 6d. 1307

This little glossary contains not only scientific terms but also technical jargon, abbreviations, and place names of atomic laboratories or installations. The following sequence of headings is given as an example: Springfields, S.S.E.B., Strontium, Swimming pool reactor, Synchrotron, Tandem generator, Target.—R.M.

## REPORTS

Great Britain. (1960). **Report of the Ministry of Health for the year 1959. Part II. On the state of the public health.** [Charles, J. A.] pp. 292. London: H.M. Stat. Off. 13s. 0d. 1308

During 1959 only one death was attributed to undulant fever, bringing the total number of deaths during the past ten years to 15. A scheme for collaboration between the Veterinary Investigation Service and the Public Health Laboratory Service started in June. It was hoped that this would result in better detection of human disease acquired from animals, particularly with regard to salmonella infections. Salmonella food poisoning was mainly caused by *S. typhimurium*. One outbreak was traced by means of phage-typing to a transit depot for calves. The Antibiotics Panel examined problems arising from the occurrence of antibiotics in milk.—R.M.

Great Britain. (1960). **National Institute for research in dairying, report 1959.** pp. 154. Shinfield: The Institute. 4s. 1309

Work on BOVINE MASTITIS included the effect of the vacuum level and teat-cup liner of milking machines on incidence, infections during the dry period, and the effect of mastitis on milk composition. Magnesium

balance experiments were performed on two cows. Salivation in cows was studied. The bacteriology department undertook, among other things, serological typing of streptococci and phage typing of staphylococci. Studies on microflora of the alimentary tract of cattle, pig and chick continued.—R.M.

Australia. (1959). **Eleventh annual report of the Commonwealth Scientific and Industrial Research Organization for the year 1958-59.** pp. 181. Canberra: A. J. Arthur, Commonwealth Govt. Printer. 10s. 6d. 1310

*Brucella abortus* Strain 19 injected into rams by various routes persisted in the seminal vesicles. Antibodies from such sheep fixed complement in the presence of *Br. ovis* antigen.

VIBRIOSIS is a major cause of infertility in dairy herds. Vaginal mucus agglutination was the best diagnostic test.

*Fusiformis nodosus* produces an enzyme which attacks the junction of the pre-keratin and prickle cell layers of the hoof. Keratin provides an essential growth factor for the organisms in cultures. Further studies are in progress on the association of *Strongyloides papillosus* and FOOT ROT. In an outbreak of "SCALD" an organism closely resembling *F. nodosus* was isolated. Scald differs from

foot-rot clinically because there is no under-running of the horn.

A motile coccoid stage of *Dermatophilus dermatonomus* is responsible for transmission of MYCOTIC DERMATITIS.

Studies on PLEUROPNEUMONIA showed that vaccinated cattle resisted exposure to aerosol culture better than exposure to a high density of acute cases. Egg vaccine was more effective than liquid vaccine, and there was no attenuation or loss of efficiency between 5th and 52nd passage of egg vaccine. With subcutaneous challenge, efficiency was almost absolute one month after vaccination, when c.f. reactions were at their peak, but had decreased 20–30% 5–6 months later when c.f. reactions were negative; at this time protection was chiefly in the form of early regression of lesions. In the acute disease *Mycoplasma mycoides* was discharged in saliva and nasal mucus, and typical cases occurred in young calves in the infected herd, accompanied by polyarthritis. Freeze-dried vaccine was viable at 4°C. for over a year. Cow pox infection did not interfere with the c.f. test for pleuropneumonia. During the year 1,500,000 doses of "V5" liquid culture vaccine were issued, in Australia, Kenya, Assam and the Philippines.

*Babesia bigemina* showed a very low infection rate in larvae of *Boophilus microplus*. No intermediate stages have yet been identified in the tick nor in the skin or liver of infected cattle. Parasitaemia occurred 7 days after the application of infected larval ticks. Some cases of cerebral babesiosis (*B. argentina*) occurred in transmission experiments. Carriers of *B. bigemina* can be detected by examination of a thick blood smear and by a c.f. test.

A virus of the psittacosis-lymphogranuloma group was found in the intestines of calves in Victoria. It appears non-pathogenic. A disease resembling "epizootic diarrhoea of cattle" or "winter dysentery" was diagnosed clinically in Victoria.

Even in hot climates the microclimate on the legs and scrotum of sheep remained favourable for the development of *Linognathus pedalis*. Dipping in 0.2% arsenic controlled *Psorergates ovis* as effectively as dipping in lime sulphur. Dipping in delta BHC and systemic use of aldrin, diazinon and "Korlan" were not effective. Tip spraying with 1% arsenic showed promise. *Chrysomya rufifacies* did not survive the winter at Canberra. Variations in light influence induction of the diapause. Maternal induced

diapause enables *Lucilia cuprina* to produce overwintering stock. Using larval implant methods, 1-naphthyl N-methylcarbamate and an organic phosphorus compound, "Rogor 40", were not very effective, but dicapthion prevented development for up to 78 days. Diazinon in the fleece deters *L. cuprina* from ovipositing. *Haemaphysalis bispinosa* reproduces by obligatory parthenogenesis. Male ticks are scarce (1 to 400 females) and do not contain spermatazoa. *Ixodes holocyclus* may not be the only species responsible for TICK PARALYSIS. No resistance to organic phosphorus insecticides by *B. microplus* has been found, but more strains resistant to DDT have appeared. In New South Wales where an eradication campaign failed, the ticks are susceptible to DDT. The activity of Bayer "21/199" declines rapidly in dirty dipping baths. Mixtures of DDT and organic phosphorus insecticides have advantages over either alone.

In animals infested with *I. holocyclus* (cause of TICK PARALYSIS) it was found that diphosphopyridine nucleotide-dependent substrate oxidations were inhibited in the citric acid cycle of liver and brain mitochondria, and could be restored by addition of DPN.

The intermediate host of *Fasciola hepatica* in coastal Queensland is *Simlimnea sub-aquatilis*; the optimum temperature for its reproduction is 24°–26°C. Egg masses produced in winter do not hatch until spring. Snails can aestivate in mud for at least 11 months. Copper sulphate and copper pentachlorophenate are more effective molluscicides than zinc sulphate or zinc pentachlorophenate. The average incidence of *F. hepatica* in sheep in N.S.W. was 13.8% and in cattle 87.9% (dairy) and 44.6% (beef).

An egg count technique for cattle faeces has been developed to detect counts as low as one egg in 2 g. faeces. Faecal cultures have been improved by mixing with vermiculite (a powdered mica derivative). The most severe pathogenic effects of *Oesophagostomum radiatum* were due to the immature 5th stage worms. No substantial differences were seen in haemagglutination and c.f. tests between cattle which died from helminthosis and survivors. Fatal cases often developed high titres. Circulating antibodies detected by these techniques are not responsible for development of resistance, and simply indicate that the host has experienced an infestation. Peaks of larval abundance in pastures were related to high rainfall. Abundant pasture growth



diluted larval counts, especially *Haemonchus* and *Oesophagostomum*. When pastures are good and intake by cattle increases, even low larval numbers (per lb.) may produce fatal infestations. Only a small percentage of eggs of *Oe. radiatum* hatched at 105°F., but at 60° development was normal and infective larvae were present after 21 days. Eggs of *Cooperia pectinata* and *C. punctata* hatched at 105° and infective larvae were present in 4 days; at 60° the infective stage was not reached until 15 days. Eggs of *Ostertagia ostertagi* were killed at 105°, but developed at 60° and produced infective larvae in 10 days. Eggs of *Trichostrongylus axei* hatched at 105° and 60° and infective larvae appeared in 11 days. The pH in segments of the gastro-intestinal tract indicated that only in the ileum, caecum and colon was the concentration of hyroxyl ions likely to limit the concentration of copper ions, thereby reducing the copper available for diffusion into the worms.

The nutrition of sheep did not influence the establishment of *T. colubriformis* but greatly influenced the severity of the infestations, which were most severe when resulting from a single rather than repeated doses of larvae. When challenged 4 months after the initial infestation most of the sheep on the high-plane ration were resistant while most of those on the low plane were susceptible.

The main antigenic stimulus at "self-cure" was derived from substances released from larvae during the third ecdysis. Exsheathing fluid contains a protein and a dialysable cofactor. Dialysis destroys activity which is restored by Mn or Mg ions. Activity is suppressed by iodoacetate and is probably an enzyme-catalysed reaction. Exsheathing fluid contains antigens, some specific. When larvae release exsheathing fluid in the presence of antiserum, precipitates form at the excretory pore.

In cattle Bayer "L13/59" was effective against *O. ostertagi* at 2.5 and 5 g./100 lb. body wt. Another organic phosphorus compound, "Nexion 1384", was effective against *H. placei* at 5 and 10 g./100 lb. body wt. but erratic against *Cooperia* spp. and *Oe. radiatum*. The higher dose was ineffective against *T. axei*, the lower dose was effective against *O. ostertagi*. Bephenium hydroxynaphthoate at 5 g./100 lb. body wt. was ineffective against *H. placei* and *Bunostomum phlebotomum*, but moderately effective against *Cooperia* spp. When the dose was doubled it was effective against *H. placei*, *Cooperia*

spp., *Oe. radiatum* and *T. axei*. Intramuscular carbon tetrachloride (10 ml./200 lb. body wt.) was effective against *F. hepatica*.

Some batches of phenothiazine had low anthelmintic activity. When sheep were deprived of water for 24 hours before and after administration of phenothiazine, excretion of the drug was prolonged from 7 to 28 days. More was retained in the body when fine material was used. In a field trial fine-particle material (90% less than 10  $\mu$ ) was very effective against *Nematodirus* spp., especially when swallowed into the abomasum. Efficiency against *Ostertagia* spp. and *Trichostrongylus* spp. was also high and was not affected by closure of the oesophageal groove. Phenothiazine/salt mixture (1:12) given to ewes on pasture reduced worm egg counts, and their lambs had only light infestations. Bayer "L13/59" ("Neguvon") against *Haemonchus contortus* was variable. It was not effective against *C. colubriformis* unless swallowed into the abomasum. S/c injections were effective against *H. contortus* but not *T. colubriformis*. It was not very effective against *Nematodirus* spp. A dose of 2.5 g./100 lb. body wt. was safe in lambs, weaners, wethers and ewes, including pregnant ewes treated 4 weeks, and again 2 weeks, before lambing. A dose of 5 g./100 lb. body wt. often produced toxic effects, especially when administered after swabbing with copper sulphate. In wethers a dose of 2.8 g./100 lb. body wt. was as effective against *H. contortus* as 10 g. phenothiazine. Anthelmintic activity of Bayer "21/199" ("Asuntol") was not affected by concurrent administration of sodium thiosulphate. At 0.5 g./100 lb. body wt., concurrent administration of sodium thiosulphate had slight protective action against toxic effects, but at 0.75 to 2 g./100 lb. body wt. even 10 g. sodium thiosulphate did not prevent deaths. Mixtures of "L13/59" and "21/199" did not show enhanced anthelmintic effects. Bephenium hydroxynaphthoate was more effective than the embonate, but neither was effective against *T. colubriformis* unless swallowed into the abomasum. Doses of the embonate exceeding 10 to 20 g./100 lb. body wt. were often toxic. In a field trial the embonate was very effective against *Nematodirus* spp. especially after swabbing over the tongue with copper sulphate. Carbon tetrachloride, 1 to 4 ml. intramuscularly was moderately effective against *H. contortus*. 1, 8-dihydroxyanthraquinone (2 g.) into the abomasum was ineffective against *T. colubri-*

*formis*. A mixture of this drug with  $\text{CCl}_4$  did not produce toxic effects in grazing ewes. Daily doses of 5 ml. Safrole for 7 to 14 days reduced egg counts of *H. contortus* in some sheep. Feeding of "Hygromycin" depressed appetite but reduced worm egg counts over 8 weeks. *H. contortus* and *Oe. columbianum* were affected more than *T. colubriformis*. Nicotine sulphate and sodium arsenite must be swallowed into the abomasum to ensure high efficiency against *Moniezia* spp.

Phenothiazines have been synthesized by selective reduction of a nitro group of the corresponding 2, 2-dinitrodiphenyl sulphides in alkali and by the action of sodium sulphide on *o*-halonitrobenzenes in a high boiling solvent.

In studies in potability of water, sheep tolerated 0.9% sodium chloride plus 0.5% sodium sulphate. The effect of magnesium salts is under investigation.

Failure to metabolize propionic acid is the most serious disability of ruminants affected by COBALT DEFICIENCY. The roles of vitamin  $\text{B}_{12}$  and folic acid in intermediary metabolism of fatty acids were studied in ruminants and rats. Methods of assessing concentrations of vitamin  $\text{B}_{12}$  in biological material are being developed with *Euglena gracilis* as test organism. The efficacy of cobalt "bullets" has been improved by increasing their density to avoid regurgitation, and by introducing either two pellets into each sheep, or by introducing another heavy object, *i.e.* a  $\frac{3}{8}$  by  $\frac{1}{2}$  inch. grub screw, with the pellet, to ensure continued abrasion of deposits which may form on the pellets. Heavy pellets containing copper were unsatisfactory in preventing COPPER DEFICIENCY.

Studies on jaundice in sheep due to chronic COPPER POISONING showed that when the diet is low in protein, and sulphate is low enough to allow Cu to accumulate, the effect of molybdenum in regulating it may be interfered with by manganese, the effects of which can be overcome by increasing intake of either molybdenum or sulphate. Thyroxin reduced build-up of Cu in the liver. Fowls and ducks have the same capacity to control Cu storage.

Weekly ruminal injections of 200 mg. oxytetracycline reduced the incidence of BLOAT in cattle grazing clover-rich pastures.

Studies on renal physiology have begun with emphasis on URINARY CALCULI in sheep.

The toxicity of *Phalaris tuberosa* (in causing PHALARIS STAGGERS) may be great enough to produce clinical symptoms within 6

days of grazing on the plant. The toxic principle does not appear to function as an anticholine esterase.

The pyrrolizidine alkaloids of *Heliotropium europaeum*, but not their *N*-oxides, inhibited enzymes requiring pyridine nucleotide by affecting mitochondrial membrane permeability in a manner different from hydrocortisone. The hyperacute toxicity of large doses of the alkaloids is due to blockage of impulses across neuro-muscular junctions. The alkaloids form complexes with copper, and one of them, lasiocarpine, is much less toxic when complexed with copper. Rats and a dwarf strain of mice have been used in studies on the alkaloids to discover the nature of the biochemical lesion and a study of the conditions under which fatalities occur.

Nutritional and breeding studies on cattle concerned zebu-cross dairy herd, coat-shedding, sweat glands, hormones in beef production, coat type and performance in the tropics, precancerous lesions of the eye, copper supplementation etc.—H. McL. GORDON.

MacOwan, K. D. S. (1960). **Kenya. Veterinary Department Annual Report, 1959.** pp. 111. Nairobi: Govt. Printer. Sh.5. 1311

Recruitment to the Department was more satisfactory and by the end of the year the Laboratory and Research Division was practically up to full establishment.

In addition to spasmodic outbreaks of "O" and "A" types of FOOT AND MOUTH DISEASE there was a renewal of the threat of the South African Type 2 infection which re-appeared in July in the Samburu African Area.

Throughout the year the central factory abattoir was successfully protected from F. & M. disease.

In January, 1959, 32 farms were in quarantine for LUMPY SKIN DISEASE in the Nakura district. In May the first consignment of vaccine arrived and 74,000 cattle were vaccinated, all foci of infection being ringed by vaccination up to five miles. At the end of the year no known foci of the disease existed in Kenya.

No RINDERPEST occurred in the European farming areas in 1959. In the northern pastoral areas of the Northern Province infection was widespread in buffalo and outbreaks occurred in cattle from Ethiopia which graze on both sides of the border. The total of rinderpest inoculations was 1,492,430.

Most important research work was carried



out on tsetse-fly and trials with chemotherapeutic drugs against TRYPANOSOMIASIS.

Only five cases of TUBERCULOSIS were found on meat inspection at the Athi River abattoir which processed 72,338 carcasses from European farms.

A survey on the incidence of JOHNE'S DISEASE was made; infected farms total 38.

RABIES occurs on a small scale but steps are constantly taken to destroy straying dogs and wild carnivora such as jackals and hyena.

Infertility diseases still represent an important economic hazard; (VIBRIOSIS, TRICHOMONIASIS, EPIDIDYMITIS-VAGINITIS).

NEWCASTLE DISEASE continued to cause losses in back-yard flocks.

In discussing meat inspection it is stated that the heavy toll which *Cysticercus bovis* levied on the livestock industry up to 1957 has been reduced by as much as 5.6% in the last three years, especially in the year under review.

A noteworthy advance in the year's work was the rapid development of a vaccine against LUMPY SKIN DISEASE. More than 90,000 doses were issued and used strategically by the field staff. This achievement tended to overshadow the great work put into the diagnostic service and the analysis and the improvement of existing vaccines. These are dealt with later in the report.

The report describes the Zoological Service, the Animal Husbandry and Livestock Improvement and trade in Livestock and animal products.

Twenty-five publications by the staff are listed and numerous legislative ordinances were published.—D. S. RABAGLIATI.

British Guiana. (1960). **Annual report of the Director of Agriculture for the year 1959.** pp. 76. [Items of veterinary interest. pp. 53-60.] 1312

No details of disease outbreaks are given. It is stated that the main outbreaks of disease were paralytic RABIES and EQUINE ENCEPHALOMYELITIS. Other diseases mentioned without comment are:—ANTHRAX, MASTITIS, *Vibrio fetus* (ABORTION), PULLORUM DISEASE, FOWL TYPHOID, FOWL CHOLERA, NEWCASTLE DISEASE and FOWL POX.

TRICHOMONIASIS was diagnosed in all the bulls (17) at the Ebini Livestock Station, where there is a total of 954 head. There are 545 cows and the number of calves born was 216 alive and 18 dead. ANAPLASMOSIS and PIROPLASMOSIS appear to be endemic.

COCCIDIOSIS was diagnosed in calves and in poultry.

TUBERCULOSIS—One bull at the Central Agricultural Station reacted when tested and was slaughtered.

TICKS are no longer susceptible to BHC. Alternative parasiticides are being tested (no details).

Very little research work is undertaken owing to "limitation of staff". There is no Veterinary Pathologist or Research Officer. It is stated that biopsy specimens are being obtained of fluke-infected livers. These are being studied by the Government Pathologist (Medical), and some are sent to Cambridge and also to the University of the West Indies in Jamaica.

Each District has a small laboratory and technical assistance for the Veterinary Officer. It is intended to organize a comprehensive laboratory. One technician has been trained so far.

The Government's policy is to encourage the expansion of the dairy and beef industry.

—J. A. GRIFFITHS.

Bermuda. (1960). **Annual report of the Director of Agriculture for the year 1959.** pp. 14. Bermuda: Bermuda Press Ltd. [Animal husbandry p. 11.] 1313

A severe outbreak of TUBERCULOSIS was diagnosed in one herd of dairy cattle, when six animals were slaughtered. Subsequent tests revealed another 19 reactors. No reactor in this herd was found during the two preceding years. No other herd was affected.

Some 93 calves were inoculated with *Brucella abortus* Strain 19 vaccine and 350 pigs were inoculated with anti-swine-fever vaccine.—D. S. RABAGLIATI.

Colony of North Borneo. (1960). **Annual Report on the Department of Agriculture for the year 1959.** pp. 74. Jesselton: Govt. Printing Department. \$3.00. 6s. 8d. [Animal husbandry branch pp. 39-50.] 1314

North Borneo has continued to be free from all major epizootics. No case of rinderpest, foot and mouth disease nor contagious pleuropneumonia occurred, nor was any case of anthrax nor tuberculosis encountered. The Colony also remains free from rabies. In ponies, only SURRA, caused by *Trypanosoma evansi* was met with but the disease has virtually been eradicated.

Poultry suffer from a large number of diseases and vaccination campaigns against NEWCASTLE DISEASE and FOWL POX are

carried on as well as against COCCIDIOSIS.

The work of the Animal Husbandry Branch is now divided into five main parts:—1, Quarantine and import restrictions; 2, control work on those diseases which do occur, for example surra in horses, and poultry diseases; 3, investigations into more chronic diseases such as JOHNE'S DISEASE which has been encountered; 4, animal management and breeding; and 5, Marketing.

The report discusses the work of the Branch under the following heads: buffaloes,

cattle, sheep, goats, pigs, poultry, dogs and even cats, commencing with general remarks, then referring to quarantine, diseased conditions, breeding, management etc.

The Laboratory carries out investigations on and diagnosis of diseases, collection of information of incidence and occurrence of specific disease parasites, testing the efficiency of control measures and the training of the junior staff in the collection of material for submission to the Laboratory. Details are given in an appendix.—D. S. RABAGLIATI.

## BOOK REVIEWS

Hawker, L. E., Linton, A. H., Folkes, B. F. & Carlile, J. J. (1960). **An introduction to the biology of micro-organisms.** pp. vii+452. London: Edward Arnold (Publishers) Ltd. 35s. 1315

This book is divided into 3 main sections dealing respectively with the morphology and life cycle of micro-organisms, their physiology and metabolism and their ecology. It is intended primarily for University courses in microbiology and deals with bacteria, fungi, protozoa and slime moulds, algae and viruses. Covering such a wide field, it is inevitable that it will not give enough detail for the veterinary student; nevertheless, the book is a valuable addition and brings together, in one volume, much information on micro-organisms in general and not from the disease point of view alone.

The book is very well produced with excellent photographs and line drawings. At the end of each chapter, there is a well chosen and up to date list of books and articles for further study.—W. J. BRINLEY MORGAN.

Duncan, D. L. & Lodge, G. A. (1960). **Diet in relation to reproduction and the viability of the young. Part III. Pigs.** pp. vii+106. Farnham Royal: Commonwealth Agricultural Bureaux. [Technical Communication No. 21 of the Commonwealth Bureau of Animal Nutrition.] 20s. 1316

Part I of this series dealt with rats and other laboratory animals and Part II dealt with sheep. Now we have Part III, a review of the literature concerning reproduction in

pigs and the influence of nutrition on reproduction. There are chapters on the physiology of pregnancy and lactation; variations in the reproductive performance of sows and their causes; nutrient requirements of the sow; nutrition of the boar.—R.M.

Young, L. & Maw, G. A. (1958). **The metabolism of sulphur compounds.** pp. 180. London: Methuen & Co. Ltd. New York: John Wiley & Sons, Inc. 16s. 1317

This is one of a series of Monographs on Biochemical Subjects. It deals with the metabolism of various organic and inorganic compounds of sulphur in higher animals and in micro-organisms. Problems of sulphur metabolism have received much attention in recent years and this book is an attempt to describe what has been accomplished.—R.M.

Lawson, D. F. (1960). **The technique of photomicrography.** pp. xvi+256. London: George Newnes Ltd. 55s. 1318

This expertly written and very well produced work deals, apart from the theoretical principles involved, with equipment, mounting, staining and processing methods used in connexion with modern photomicrographic techniques. There are chapters on the microscope and its parts, types and methods of illumination, photographic equipment and stereoscopic, flashlight and colour techniques. The glossary of technical terms, list of references and subject index add to its value as a reference book. There are over 70 plates (some in colour) and 114 line drawings, of exceptional quality.—E.G.



## BOOKS RECEIVED

[Notice of recently received books in this list does not preclude review]

- Ainsworth, G. C. (1961). *Ainsworth & Bisby's dictionary of the fungi*. pp. viii + 547. Kew: Commonwealth Mycological Institute. 5th edit. 30s.
- Berge, E. & Westhues, M. (1961). *Tierärztliche Operationslehre. [Veterinary surgery.]* pp. xv + 399. Berlin (& Hamburg): Paul Parey. 28th edit. DM 39.60.
- Bolz, W. (1961). *Allgemeinnarkose beim Tier unter Berücksichtigung der Wild-, Zoo- und Laboratoriumstiere. [General anaesthesia in domesticated, wild, zoo and laboratory animals.]* pp. xi + 256. Stuttgart: Ferdinand Enke. DM 38.40.
- von Buddenbrock, W. (1961). *Vergleichende Physiologie. Band V. Physiologie der Erfolgsorgane. [Comparative physiology. Volume V. Muscles, ciliae, light organs and electric organs.]* pp. 390. Basel (& Stuttgart): Birkhäuser. DM 54.
- Franzke, H. J. & Smollich, A. (1960). *Anleitung zur Exenteration. [Guide to exenteration—post-mortem technique.]* pp. viii + 103. Jena: Gustav Fischer. DM 12.
- Morris, D. & Jarvis, C. (Edited by) (1960). *The international zoo yearbook. Vol. I. 1959.* pp. 160. London: The Zoological Society. 40s.
- Pool, W. A. (Edited by) (1960). *The veterinary annual. 2nd year. 1960.* pp. xxiv + 359. Bristol: John Wright & Sons Ltd. Toronto: The Macmillan Co. of Canada Ltd. Baltimore: The Williams & Wilkins Co. 42s.
- Popesko, P. (1961). *Atlas der topographischen Anatomie der Haustiere. Band I. Topographische Anatomie des Kopfes und Halses. [Atlas of topographical anatomy of domesticated animals. I. Head and neck.]* pp. 215. Jena: Gustav Fischer. DM 45.
- Romanoff, A. L. (1960). *The avian embryo: structural and functional development.* pp. xvi + 1305. New York (& London): The Macmillan Company. 210s.
- Schützler, G. (1961). *Generalregister zum Archiv für wissenschaftliche und praktische Tierheilkunde 1875-1944, Bände 1-79 einschliesslich der Supplement-Bände. [General index to "Archiv für wissenschaftliche und praktische Tierheilkunde" 1875-1944, volumes 1 to 79.]* pp. 128. Berlin (& Hamburg): Paul Parey. DM 28.

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## CONTENTS

	<i>Page</i>
Diseases caused by Bacteria and Fungi ... ..	237
Diseases caused by Protozoan Parasites ... ..	252
Diseases caused by Viruses and Rickettsia ... ..	255
Immunity ... ..	269
Parasites in Relation to Disease [Arthropods] ... ..	271
Parasites in Relation to Disease [Helminths] ... ..	272
Spontaneous and Transmissible Neoplasms and Leucaemias [Including Fowl Paralysis] ... ..	275
Nutritional and Metabolic Disorders ... ..	277
Diseases, General ... ..	281
Poisons and Poisoning ... ..	284
Pharmacology and General Therapeutics ... ..	285
Physiology, Anatomy and Biochemistry ... ..	286
Public Health, Veterinary Services and Veterinary Education ... ..	291
Reproduction and Reproductive Disorders ... ..	291
Zootechny ... ..	294
Technique and Apparatus ... ..	296
Reports ... ..	296
Book Reviews ... ..	298
Books Received ... ..	300

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Volumes 13—27 (1945-1959) are still available. Stocks of other volumes are incomplete. Details on request.



# INDEX TO AUTHORS

- Abdulla Khan, C. K., 1448.  
 Abinanti, F. R., 1467.  
 Ablett, R. E., 1490.  
 Adams-Mayne, M., 1639.  
 Akulov, A. V., 1411.  
 Alexandrov, N. I., 1399.  
 Alosi, C., 1430.  
 Alsop, J., 1508.  
 Altenkirch, W., 1637.  
 Arditi, E., 1513.  
 Armstrong, D. G., 1597.  
 Armstrong, W. H., 1504.  
 Arnold, G. W., 1646.  
 Ashton, W. M., 1565.  
 Atkins, N., 1351, 1352.  
 Austwick, P. K. C., 1403.
- Bachnick, G., 1637.  
 Balmukkambetov, K., 1608.  
 Baker, J. A., 1465, 1477, 1481.  
 Baker, L. A., 1490.  
 Barlow, R. M., 1563.  
 Barnett, A. J. G., page 300.  
 Barrentine, B. F., 1558.  
 le Bars, H., page 300.  
 Barson, G. F., 1593.  
 Bartels, H., 1666.  
 Basova, N. N., 1510.  
 Basse, A., 1493.  
 Bateman, J. B., 1357.  
 Baynes, I. D., 1408.  
 Bazanova, N. U., 1606, 1617.  
 Becker, E. L., 1512.  
 Bennett, C. A., 1585.  
 Beran, G. W., 1487.  
 Berk, R., 1515.  
 Berrier, H. H., 300.  
 Better, N., 1351.  
 Bevis, M. A., 1593.  
 Biancardi, G., 1359.  
 Bigalke, R. D., 1425.  
 Bindrich, H., 1445, 1470.  
 Blackshaw, A. W., 1632.  
 Blaxter, K. L., 1597.  
 Blažek, K., 1428.  
 Blom, E., 1641.  
 Bogdan, J., 1376.  
 Donchev, N., 1480, 1485.  
 Borgen, H. C., 1433.  
 Bowden, R. S. T., 1492.  
 Boyden, S. V., 1511.  
 Brandy, C. A., page 300.  
 Breza, M., 1535.  
 Briggs, J. D., 1519.  
 Brion, A., 1489.  
 Broome, A. W., 1354, 1355.  
 Bronner, F., page 300.  
 Brougham, R. W., 1571.  
 Brown, D. H., 1675.  
 Brown, R. H., 1460.  
 Brues, A. M., 1664.  
 Bryan, M. W., 1534.  
 Bryant, M. P., 1558.  
 Buchanan-Davidson, D. J., 1400, 1401.  
 Büchlmann, E., 1441.  
 Bürki, F., 1368.  
 Bukulov, I. A., 1347.  
 Burgisser, H., 1429.  
 Burmester, B. R., 1546, 1551, 1552.  
 Burns, M. A., 1647.  
 Buslaev, M. A., 1446.  
 Bussières, J., 1530.  
 Bustad, L. K., 1585.  
 Butler, E. J., 1563.  
 Rutler, G. W., 1571.  
 Butozan, V., 1476.  
 Buziassy, C., 1569.
- Campbell, D. E. S., 1619.  
 Campbell, I. R., 1650.  
 Casida, L. E., 1353, 1354, 1355.  
 Cass, J. S., 1650.  
 Cavey, W. A., 1518.  
 Cedro, V. C. F., 1378.  
 Celer, V., 1386.  
 Chauvrat, J., 1343.  
 Ch'en Yi-teh and others, 1453.  
 Cherkasov, V. A., 1579.  
 Chernikova, T. M., 1510.  
 Chodkowski, A., 1375.  
 Chomiak, T. W., 1505.  
 Christensen, N. O., 1641.
- Christie, M. G., 1539.  
 Cirstet, I., 1488.  
 Cisale, H. O., 1378.  
 Clapperton, J. L., 1597.  
 Clark, L. G., 1380, 1381.  
 Cliver, D. O., 1472.  
 Coles, B. L., 1561.  
 Colichon, Y., H., 1362.  
 Coman, L., 1488.  
 Comar, C. L., page 300.  
 Connell, F. H., 1532.  
 Cook, J., 1660.  
 Cortez, A., 1494.  
 Corticelli, B., 1537.  
 Cosic, D., 1324.  
 De Cou, D. F., 1610.  
 Courter, R., 1322.  
 Cowie, A. T., page 300.
- Davidson, M., 1424.  
 Davis, J. W. C., 1651.  
 Davis, M. E., 1574.  
 Davis, M. S., 1357.  
 Degtyarev, V. I., 1383.  
 Dehmel, H., 1393.  
 Dekeyser, P. J., 1471.  
 Delli Quadri, C. A., 1575.  
 Demma, I., 1497.  
 Devos, A., 1350.  
 Dhanda, M. R., 1500.  
 Diallo, M. S., 1406.  
 Dickerson, J. W. T., 1555.  
 Diernhofer, K., 1371.  
 Dobrynina, A. Y., 1649.  
 Dowling, D. F., 1598.  
 Dozza, G., 1545.  
 Drapalyuk, E. I., 1395.  
 Drozdov, G. G., 1509.  
 van Duin, C., Jr., 1630.  
 Dumontell, C., 1377.  
 Dymko, E. F., 1564.  
 Dynna, O., 1562.
- Edward, D. G. ff., 1413.  
 Edwards, M. J., 1464.  
 Egan, A. N., 1463.  
 Embleton, D. P. F., 1332.  
 Ender, F., 1562.  
 Entel, H. J., 1370.  
 Eriksson, E., 1390.  
 Euzéby, J., 1530.
- Faddeev, L. A., 1577.  
 Fedida, M., 1439.  
 Feoktistov, P. N., 1411.  
 Ferguson, D. L., 1422.  
 Fêteanu, A., 1488.  
 Fina, L. R., 1610.  
 Fine, J., 1351, 1352.  
 Fischer, K., 1484.  
 Fleming, L. W., 1319.  
 Flewett, T. H., 1508.  
 Flux, D. S., 1571.  
 Fomina, A. Y., 1411.  
 Fomina, N. V., 1611.  
 Fontaine, M., 1489.  
 Fontaine, M. P., 1489.  
 Fontes, A. K., 1546, 1551, 1552.  
 Foster, J. R., 1508.  
 Fraga de Azevedo, J., 1382.  
 Frank, E. D., 1351.  
 Fraser, A., 1667.  
 Fraser, G., 1404.  
 Freerksen, E., 1329.  
 French, E. L., 1463.  
 Fritzsche, K., 1367.  
 Fukui, K., 1372.  
 Fukui, R., 1372.
- Gagov, I., 1499.  
 Galbraith, T. A., 1585.  
 Gallagher, C. H., 1500.  
 Galton, M. M., 1322.  
 Gapochko, K. G., 1399.  
 Garin, N. S., 1399.  
 Garner, R. J., 1604, 1609.  
 Gavrilets, E. S., 1414.  
 Gebhardt, L. P., 1454.  
 Gee, G. R., 1642.  
 Gefen, N. E., 1399.  
 Gentles, J. C., 1662.  
 Gerov, K., 1326.  
 Geurden, L. M. G., 1350.
- Ghaffar, S. A., 1458.  
 Gibor, A., 1654.  
 Gibson, A. J. F., 1518.  
 Gillespie, J. H., 1465, 1481.  
 Girard, A., 1491.  
 Godfrey, D. G., 1415.  
 Goffe, A. P., 1340.  
 Gordon, H. McL., 1540.  
 Goret, P., 1489.  
 Graham, N. McC., 1597.  
 Graheer, H., 1432.  
 Gratzl, E., 1379.  
 Gray, A. R., 1418.  
 Gray, M. L., 1346.  
 Griem, W., 1483.  
 De Groodt, M., 1621.  
 Groupé, V., 1547.  
 Grublauskas, L., 1486.  
 Gründer, H.-D., 1468.  
 Güralp, N., 1528, 1531.  
 Guercio, V., 1497.
- Hackett, P. L., 1585.  
 Hafez, E. S. E., 1629.  
 Hall, W. T. K., 1520.  
 Hammond, D. M., 1422.  
 Hannan, J., 1554.  
 Hart, C. F., 1492.  
 Hart, I. H., 1398.  
 Hauke, H., 1325.  
 Havre, G. N., 1562.  
 Hawk, H. W., 1356.  
 Hayden, A. R., 1512.  
 Healey, J. S., 1642.  
 Hecke, F., 1438.  
 Heideman, M. J., 1599.  
 Heje, N.-I., 1550.  
 Hekimoğlu, H., 1384, 1385.  
 Helmbo'dt, C. F., 1505.  
 Henle, W., 1502.  
 van Heyningen, W. E., 1391.  
 Hill, D. W., 1454.  
 Hodgman, S. F. J., 1492.  
 Hollister, C. J., 1380, 1381.  
 Holt, H. D., 1340.  
 Horiuchi, T., 1553.  
 Hovorka, J., 1527.  
 Howell, P. G., 1473.  
 Hreczko, I., 1419.  
 Hsiao May Wu, 1620.  
 Huddart, J. E., 1409.  
 Hughes, H. V., 1600.  
 Hurst, L., 1593.  
 Hutchison, W. F., 1534.  
 Huygelen, C., 1471.
- Isaenko, L. V., 1366.  
 Ishitani, R., 1553.  
 Ivanskii, E. F., 1582.
- Jacquot, R., page 300.  
 Jansen, B. C., 1388.  
 Jarvis, C., 1668.  
 Jennings, R. K., 1513.  
 Jennings, W. L., 1442.  
 Jennison, R. F., 1420.  
 Jentzsch, K. D., 1344.  
 Jones, H. G., 1604.  
 Joubert, S. M., 1594.  
 Joven, L. L., 1635.  
 Jungheer, E. L., page 300.  
 Juráček, V., 1535.
- Kafel, S., 1482.  
 Kamel, J., 1458.  
 Kamitsuka, P. S., 1455.  
 Kanai, K., 1328.  
 Kaplan, M. A., 1513.  
 Karlsson, K. A., 1583.  
 Kashiwa, H. K., 1567.  
 Kayser, J., 1394.  
 Kelch, F., 1666.  
 Kelentey, B., 1405.  
 Kerr, W. R., 1365.  
 Keymer, I. F., 1403, 1495.  
 Khristov, S., 1326, 1480.  
 Kiss, I., 1405.  
 Klein, M., 1506.  
 Kleinbok, M. T., 1576.  
 Klimeš, B., 1336.  
 Knoke, K.-W., 1469.  
 Knudsen, E., 1618.  
 Koch, T., page 300.
- Kochanov, N. E., 1559.  
 Köhler, H., 1657.  
 Kohl, D., 1367.  
 Kon, S. K., page 300.  
 Korotich, A. S., 1366.  
 Kostin, I. G., 1649.  
 Kostina, A. C., 1582.  
 Kotov, S. S., 1578.  
 Kovalenko, Y. R., 1411.  
 Kowalski, S., 1375.  
 Kress, F., 1330.  
 Kresse, J. I., 1380, 1381.  
 Krogh, N., 1560.  
 Kushner, H. F., 1649.  
 Kuwert, E., 1444, 1445.  
 Kwapinski, J. B., 1407.
- Lafenêtre, H., 1494.  
 Lagasse, A., 1621.  
 Lahiri, A., 1320.  
 Lai, M., 1537.  
 Lambert, H. P., 1333.  
 Landy, M., 1402.  
 Lange, L., 1650.  
 Laroche, M., 1343.  
 Lassmann, G., 1447.  
 Lauffer, M. A., page 300.  
 Lauterbach, D., 1329.  
 Law, G. R. J., 1656.  
 Leaver, D. D., 1398.  
 Leech, F. B., 1574.  
 Lehmann, D. L., 1416.  
 Lehnert, C., 1345.  
 Lengemann, F. W., 1584.  
 Lerche, M., 1370, 1666.  
 Leroy, A. M., page 300.  
 Leunen, J., 1437.  
 Lewis, A. L., 1442.  
 Liess, B., 1468, 1469.  
 Linnell, J. L., 1602.  
 Loddio, B., 1434.  
 Lucam, F., 1439.  
 Lucas, A., 1343.  
 Luginbuhl, R. E., 1505.  
 Lunaas, T., 1636.  
 Lupo, O., 1652.  
 Lyne, A. G., 1599.
- McCarthy, R. A., 1555, 1536.  
 McCarthy, P. H., 1522, 1523, 1524.  
 McCleery, E. F., 1533.  
 McClure, T. J., 1634.  
 McCreary, V. D., 1525.  
 McDonald, I. W., 1625.  
 Macintyre, I. J., 1563.  
 McIntyre, R. W., 1575.  
 McNutt, S. H., 1353, 1354, 1355.  
 Macrae, W. D., 1574.  
 Málaga T., A., 1462.  
 Maqsood, M., 1603.  
 Marraghini, M., 1430.  
 Marshak, R. R., 1380, 1381.  
 Martin, J., 1334.  
 Mathews, J., 1478.  
 Mathois, H., 1330.  
 Matscher, R., 1652.  
 Maubecin, R., 1378.  
 Medda, A., 1434.  
 Melly, M. A., 1321.  
 Merler, E., 1402.  
 Merritt, G. C., 1397.  
 Metzgar, R. S., 1514.  
 Mihalovitch, S., 1476.  
 Miles, B. J., 1609.  
 Miller, P. A., 1391.  
 Miner, M. L., 1422.  
 Mishchenko, N. G., 1446.  
 Mitev, G., 1499.  
 Mitropol'skii, A. S., 1411.  
 Mitscherlich, E., 1631.  
 Moller, T., 1550.  
 Monteiro da Costa Faro, M., 1382.  
 Moore, D. V., 1532.  
 Moore, N. W., 1688.  
 Moriaki, M., 1533.  
 Moro S., M., 1443, 1462.  
 Moroshkin, B. F., 1582.  
 Morris, D., 1668.  
 Mossdorf, R., 1370.  
 Moulton, W. M., 1459.  
 Mount, L. E., 1556.  
 Moursy, A. W., 1323.



- Mukerji, A., 1320.  
Mukula, A. L., 1569.  
Mulligan, W., 1540.  
Musaev, M. A., 1287.  
Muth, O. H., 1570.
- Nardelli, L., 1440.  
el Nasri, M., 1304.  
Nay, T., 1598.  
Neepor, C. A., 1401.  
Nelson, E. L., 1515.  
Nikolitsch, M., page 300.  
Nilakantan, P. R., 1500.  
Nobili, I., 1497.  
Nordberg, B. K., 1601.  
Nyström, G., 1300.
- Obiger, G., 1323.  
O'Byrne, T., 1588.  
Ognyanov, D., 1474.  
Oláh, P., 1479.  
Oldfield, J. E., 1570.  
Oliver, W. T., 1587.  
Olsen, M. W., 1643.  
Orlov, A. L., 1337.  
Osol, A., 1565.  
Osterhoff, D. R., 1517.  
Ostrovskaya, N. N., 1373.
- Pages, A., 1494.  
Pallaske, G., page 300.  
Panina, G., 1440.  
Pande, P. G., 1410.  
Panysheva, L. V., 1577.  
Pascoe, R. R., 1339, 1348.  
Patnaik, B., 1526.  
Paufler, S., 1631.  
Pavlov, N., 1326.  
Pavri, K. M., 1451.  
Payne, J. M., 1609.  
Pedini, B., 1572.  
Pehl, K. H., 1663.  
Pellérdy, L., 1423.  
Peredereev, N. I., 1581.  
Perrault, A., 1402.  
Pickett, M. J., 1515.  
Pigon, H., 1636.  
Pille, E. R., 1452.  
Pinus, A. A., 1586.  
Platonow, N., 1587.  
Plumer, G. J., 1467.  
Podliachouk, L., 1516.  
Polidori, F., 1563.  
Pols, J. W., 1426.  
Polyakin, V. V., 1577.  
Postnikov, V. S., 1580.  
Prasad, H., 1421.  
dal Prato, A., 1440.  
Pratt, R., 1605.  
Preston, T. R., 1557.  
Priedniek, O. K., 1626.  
Prokudin, A. V., 1617.  
Purves, D., 1563.
- Quatrefages, H., 1494.  
Queval, R., 1516.
- Rac, R., 1419.  
Race, G. J., 1620.  
Rachlin, W., 1351.  
Rae, A. L., 1571.  
Rafyi, A., 1449.  
Raggi, L. G., 1496, 1504.  
Rahneberg, H. U., 1501.  
Ramachandran, S. P., 1500.  
Ramsay, W. R., 1389.  
Rankin, J. D., 1338.  
Ranney, A. F., 1327.  
Rauscher, F. J., 1547.  
Reid, R. L., page 300.  
Reinecke, E. R., 1540.  
Reinecke, E. P., 1603.  
Remmert, L. R., 1570.  
Reuleaux, I. R., 1468.  
Reusse, U., 1374.  
Riddell-Swan, J. H., 1628.  
Rioux, J. A., 1494.  
Rislakki, V., 1431.  
Ristic, M., 1396.  
Riverson, S., 1436.  
Robertson, L., 1369.  
Robinson, I. M., 1558.  
Robson, D. S., 1465.  
Röhrer, H., 1663.  
Rogers, D. E., 1321.  
Rose, J. H., 1541.  
Rose, N. K., 1514.  
Rowson, L. E. A., 1638.  
Rudnev, M. M., 1510.  
Rusev, K., 1498.
- Salgank, M. G., 1649.  
Samoletov, A. I., 1649.  
Sandstedt, H., 1349.  
Sansom, B. F., 1604, 1609.  
Santamarina, E., 1635.  
Santero, G., 1440.  
Saxer, E., 1457.  
Scatterday, J. E., 1442.  
Schimmelpfennig, H., 1469.  
Schleger, A. V., 1645.  
Schmidt, K., 1637.  
Schneider, N. J., 1442.  
Scholz, H. D., 1361.  
Schoop, G., 1392.  
Schroeder, R. J., 1575.  
Schubert, J. R., 1570.  
Schützler, G., 1670.  
Schulte, F., 1361.  
Schulz, K. C. A., 1427.  
Schweinburg, F. B., 1352.  
Scott, G. R., 1460.  
Seastone, C. V., 1400, 1401.  
Sebrunys, M., 1621.  
Sekariah, P. C., 1410.  
Sharpless, G. R., 1551.  
Shawyer, C. V., 1558.  
Shcherbak, Y. N., 1366.  
Shear, M. J., 1402.  
Sheffy, B. E., 1477, 1481.  
Shikhobalova, N. P., page 300.  
Short, R. V., 1638.  
Shubin, V. A., 1411.  
Shul'ts [Schulz], R. S., page 300.
- Sier, A. M., 1464.  
Sikes, D., 1342.  
Simmons, G. C., 1408.  
Simms, B. T., 1528.  
Simon, J., 1353.  
Simonne, H., page 300.  
Sincher, H. J., 1610.  
Sinclair, A. N., 1518.  
Sinclair, K. B., 1565.  
Skinner, H. H., 1435.  
Skrjabin, K. I., page 300.  
Slesarenko, V. V., 1366.  
Smit, J. D., 1536.  
Smith, E. E., 1573.  
Smith, K. M., page 300.  
Smythe, R. H., page 300.  
Snoeck, G., 1350.  
Snowdon, W., 1463.  
Solov'ev, N. N., 1373.  
Sorel, P., 1640.  
Soulsby, E. J. L., 1544.  
Springer, D., 1657.  
Stahmann, M. A., 1400, 1401.  
Stakhanova, V. M., 1450.  
Steele, J. H., 1322.  
Stephen, L. E., 1418.  
Stepankina, M. K., 1613, 1615.  
Stewart, C. J., 1332.  
Stöckl, W., 1330.  
Stone, B. F., 1521.  
Stone, S. S., 1459.  
Strobbe, R., 1437.  
Stukonozhenko, P. I., 1626.  
Suchkov, Y. G., 1510.  
Suganuma, Y., 1363.  
Sula, L., 1335.  
Sutherland, D. N., 1647.  
Swanson, L. E., 1538.  
Swietlitowski, M., 1543.  
Sykes, J. F., 1356, 1558.  
Symington, R. B., 1596.  
Symons, L. E. A., 1542.
- Tadros, M. M., 1458.  
Talbot, L. M., 1595.  
Tallis, G. M., 1627.  
Tani, A., 1372.  
Tashenov, K. T., 1605, 1606, 1614.  
Tello G., A., 1362.  
Te-Yong Lou, 1455.  
Thienpont, D., 1471.  
Thiery, G., 1622.  
Thomison, J. B., 1321.  
Thompson, R. H., 1566.  
Thomson, A. R., 1609.  
Thormar, H., 1475.  
Thorsell, W., 1601.  
Till, D. H., 1593.  
Todd, J. R., 1566.  
Tomlinson, A. R., 1624.  
Torlone, V., 1545.  
Tournier, P., 1489.  
Trapani, R. J., 1402.  
Tribe, D. E., 1569.  
Trofimova, R. M., 1607, 1612, 1616.  
Tsur-Tchernomoretz, I., 1424.  
Turner, A. S., 1412.
- Turner, E., 1358.  
Turner, G. D., 1356.  
Turner, H. G., 1645.  
Turton, J. D., 1461.
- Ubertini, B., 1440.  
Ueno, H., 1529.  
Ugorski, L., 1375.  
Ullberg-Ilsson, K., 1390.  
Uvarov, O., 1592.
- Vanderplasse, M., 1350.  
Vandervelden, M., 1471.  
Varma, M. G. R., 1451.  
Varnagiris, A., 1648.  
Vasil'ev, N. T., 1549.  
de la Vega D., E., 1462.  
Velle, W., 1636.  
Vollhardt, Y., 1494.  
Vuillaume, R., 1331.
- Wade, A. E., 1538.  
Wade, J., 1639.  
Wainman, F. W., 1597.  
Walker, J., 1396.  
Walter, W. G., 1546, 1552.  
Ward, D. N., 1639.  
Watanabe, S., 1456, 1529.  
Watson, J. W., 1655.  
Watson, K. C., 1594.  
Watt, L., 1420.  
Wawrzkievicz, K., 1341.  
Webb, H. E., 1451.  
Weissenberg, I., 1424.  
Weitz, B. G. F., 1417.  
Wenner, H. A., 1455, 1487.  
Werder, A. A., 1487.  
Weyland, H., 1653.  
Whiteman, C. E., 1466.  
Whitney, L. F., 1633.  
Widdowson, E. M., 1555.  
Wiggins, G. S., 1533.  
Van den Wijngaert, M., 1350.  
Wilkinson, P. R., 1520.  
Williams, L. W., 1558.  
Wilson, J. B., 1401.  
Wilson, J. M., 1642.  
Winter, A. J., 1353, 1354, 1355.  
Witebsky, E., 1514.  
Withers, F. W., 1574.  
Wiznitzer, T., 1351, 1352.  
Woernle, H., 1503.  
Wood, R. K. S., page 300.  
Wünsche, H.-G., 1623.
- Yeast [Keast], J. C., 1588.  
Yoshida, N., 1372.  
Youmans, A. S., 1328.  
Youmans, G. P., 1328.  
Young, S. S. Y., 1627.
- Žák, F., 1335.  
Zhelev, V., 1326.  
Zinn, R., 1322.  
Zubareva, L. A., 1649.  
van Zwanenberg, D. F., 1332.

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